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JULY 1, 1948

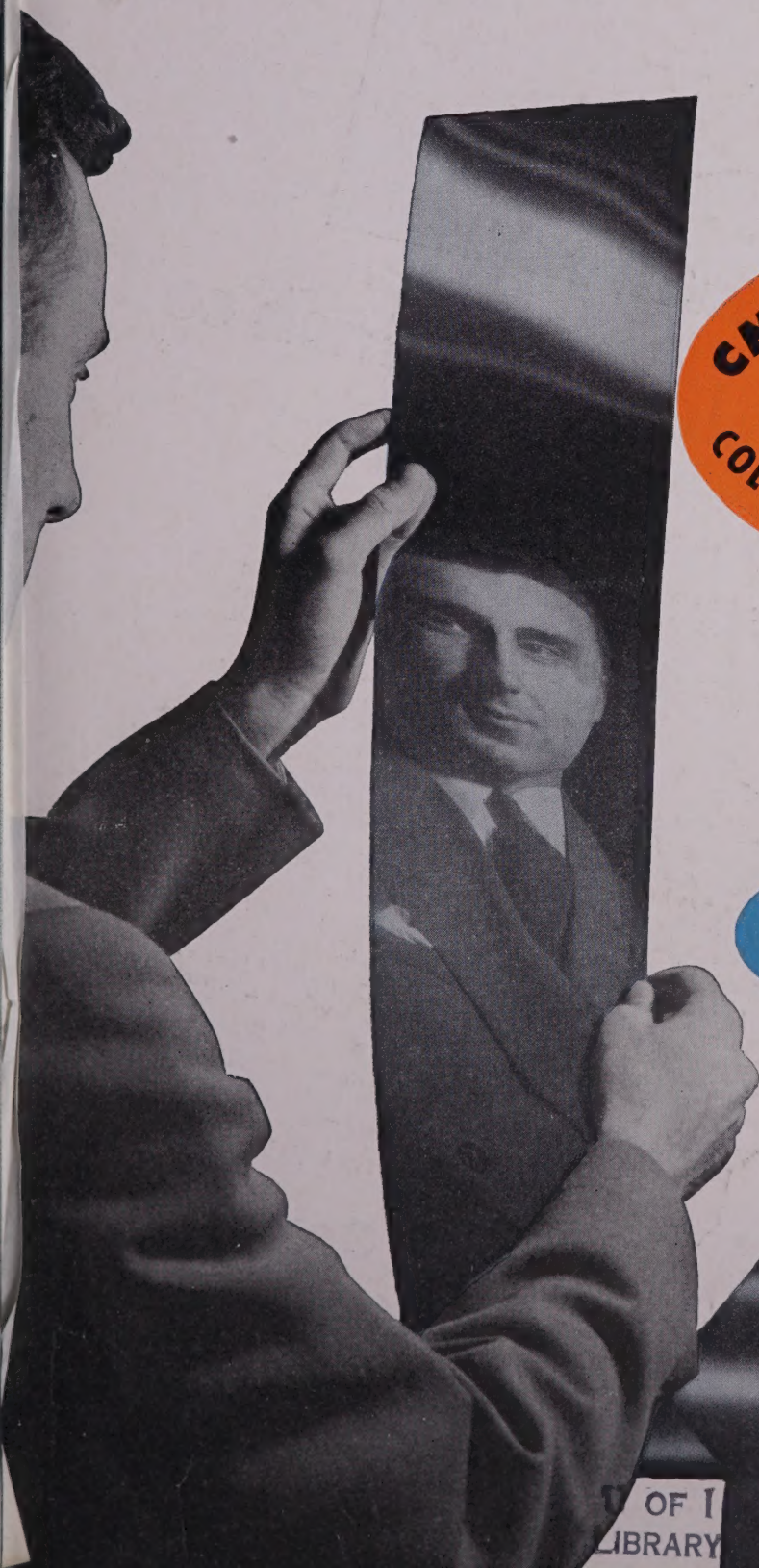


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Speedaire-equipped portable coal conveyor, built by Long Super Mine Car Co., Fayetteville, West Virginia.

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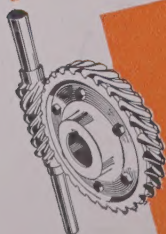
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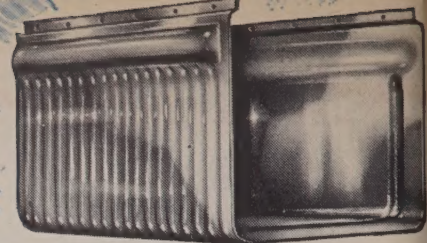
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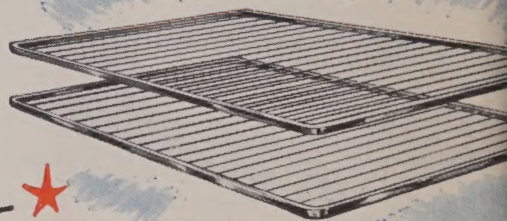
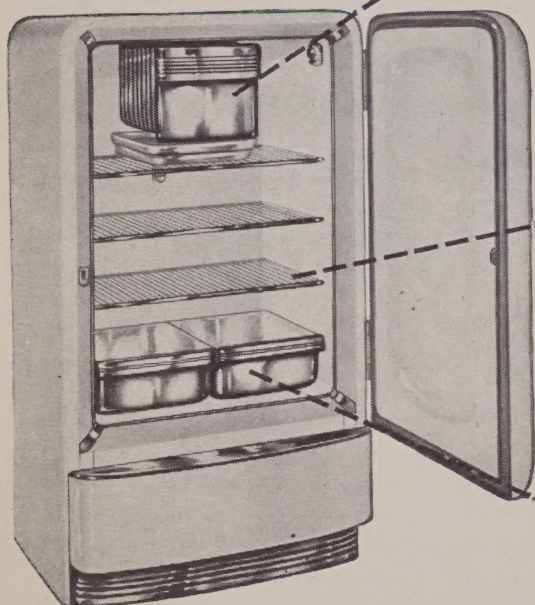
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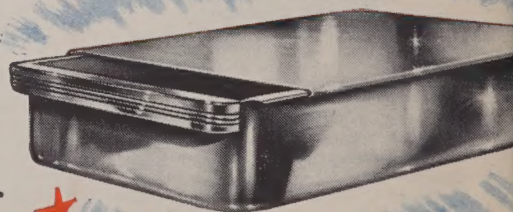
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Failure

DURING its closing hours Congress voted to continue for another year artificial price support for farm commodities. This includes the Steagall Amendment which provides for 90% parity loans on some 20 major farm crops whose high production had been urged by the government during the war. By the end of 1949, almost 4½ years will have elapsed since the end of the crisis during which maximum production was so urgent.

This action, together with the apparent "boner" on steel allocation, is among the less creditable decisions of a Congress which we think, on the whole, has done a good job. The continuation of farm price support is of particular interest to the steel industry. Last winter, it may be recalled, U.S. Steel made an adjustment in the price of a limited group of products which appeared out of line. The hue and cry provoked by this action in Washington and in editorial columns throughout the country marked a new high in the perfervid denunciation of "sinister corporate power." Three separate investigations were launched to ascertain the monopoly character of the foul deed and its effect on the cost of living. A sharp crack had just occurred in the primary commodity markets and the price advances announced by Big Steel seemed ill-timed.

Perhaps politics, whether in a democratic or a totalitarian state, must always have its scapegoats. Yet when the public suffers from rising living costs and the dollar loses its value, responsible leadership should search for authentic causes and prescribe at least a modicum of intelligent and honest therapy.

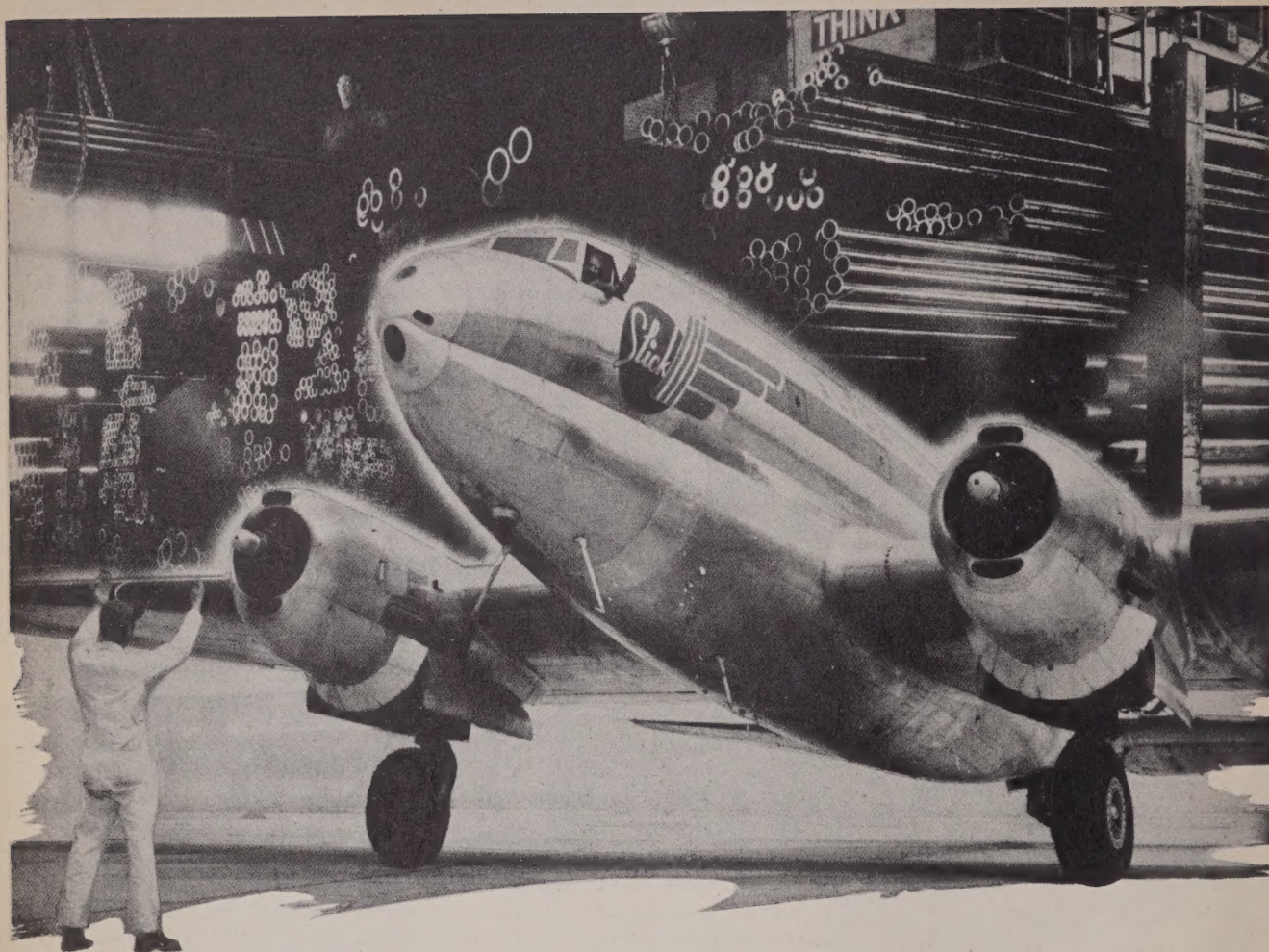
The action of Congress in extending, unchanged, wartime price support for important components in the consumer's cost of living budget is a flagrant violation of this elementary precept. Under the terms of this extended price protection, the High Cost of Living for the American consumer is underwritten for another year. Again we will see millions of bushels of potatoes, elevators full of wheat, storage warehouses bulging with poultry, eggs, prunes, citrous fruits, etc., purchased with the money of taxpayers in order to keep the living costs of these identical taxpayers at levels not justified by the market or the position of the producers.

Although government intervention in any field to protect the interests of a substantial group of producers is a violation of free enterprise economics, a strong case was made for it in the early thirties. How far sound principle, in such a situation, should be compromised to allay widespread distress is a fine problem for intelligent statesmanship.

There is no such present excuse for all-inclusive and costly support of the farm price structure. No honest student can have any doubt today regarding the causes of inflation. Fiscal and monetary policy certainly rate first place. This basic pressure has been aggravated by a labor supply under monopoly control and by broad support of farm prices to prevent better postwar supplies from moderating wartime scarcities.

If the American housewife, in the face of ample crops, still finds bread and beefsteak at annoying levels, she should look to Washington for the culprits rather than to Pittsburgh.

Joseph Stagg Lawrence



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► Steel officials are toying with the idea of establishing mild depot stocks in key consuming areas if they are forced to comply with the FTC order that would require a price at each producing or shipping point. It would help meet competition, they admit, but they're not sure it would be legal.

► Sulphur contents of low carbon sheet steel are steadily creeping up. Some makers who used to aim and meet 0.0305 max are now having difficulty staying under 0.040. The AISI manual permits 0.05 max. The mills report that lower grades of coal used to make metallurgical coke are chiefly responsible for the higher sulphurs.

► Some foundries take a dismal view of the casting competition offered by aluminum ingot producers, particularly at this time of ingot shortage and the rising price of secondary metal. Some believe that aluminum producers may be expected to reduce their fabricated products manufacturing operations as metal production grows and competition with the industry's customers becomes more embarrassing.

► Industrial recovery in France is progressing at a rate where \$3 million worth of ball bearings must be imported from the U.S. this year. Sweden is unable to increase shipments to France, but small shipments from Italy are expected.

► A built-in refrigerating unit is a new feature of wax injection units developed by engineers of the new precision casting shop of International Nickel Co. The unit cools a section of work table on which the wax mold rests when held by clamps for the injection cycle.

► Sources close to the auto industry believe most of the future expansion by the industry will occur outside Detroit. The industry is now operating 113 assembly plants in 77 cities and 24 states. This list is expected to grow in the next few years, particularly if freight rates continue to increase.

► Price revision for some brass mill products is awaiting the clarification of pending wage negotiations. The increase in the price of tin that went into effect on June 1 has not yet been reflected by higher prices for phosphor bronze, the principal mill product affected.

► One mill conducting an extensive investigation on ingot mold coatings has found that starch does the best job. The starch solution is sprayed on the molds while they are hot.

► Adding confusion to the basing point controversy is the mistaken idea that present conditions of excess demand over supply will be here forever. Under current steel demand there is no hesitation on the part of steel buyers to pay freight, or anything else, as long as they get steel. But when demand slows and steel mills have to get orders to keep their mills going, there will be only one price.

It will be then that the customer far away will find out for sure if steel mills will absorb freight, even under the basing point system, in order to supply him steel. Best guess is that many companies who pulled out of areas will stay out. If they do go back they will be choosy.

► With increased appropriations tending to speed the stockpiling program, the Munitions Board may be expected to ask OIC to include specific materials under the voluntary allocation program. The White House has already sounded out the Commerce Dept. on the feasibility and necessity of establishing such quotas.

► One of the main long range portions of the British steel development program is the proposal for a new integrated steel works in Scotland. There are critics in London who feel that there is no good reason to construct such a plant, other than political pressure from intensely nationalistic Scots. In the Scots' industrial centers, all the arguments are about the ideal location. Some opinion is that it should be in the mouth of the Clyde, others feel that it should shift to the East Coast, with the trend in coal availability. After nearly 10 years of argy-bargy, the British government has disclosed that the site is still "under discussion".

► Despite rising prices for cars, auto makers appear to be assured of a 2-year market for their products. The industry's backlogs are about as large today as they were when production was resumed after the war. Somehow, people are able to buy as many cars at today's prices as they bought before the war at prewar prices.

Welding Dissimilar Metals

With the increase in number of different combinations of alloys and superalloys being joined by metal arc welding, the fabricator finds it necessary to conduct a great deal of experimentation in order to obtain sound joints consistently. A graphical method is described in this article that makes possible the prediction of weld metal composition and structure, and embraces the joining of dissimilar metals utilizing single deposits and multipass welds. Based on the concept of dilution direction lines, this method employs the use of chromium and nickel equivalent values, making possible a consideration of most of the elements that affect microstructure.

NEW and different combinations of alloys and superalloys are being joined by metal arc welding. With every new and different combination the same question arises—"What electrode should be used so that the weld will neither crack nor lose its ductility?"

Many fabricators have been successfully welding these dissimilar metals and alloys for years, their success being attributed mainly to experience gained by the trial and error method. Welding engineers have tried different stainless steel electrodes and different procedures until a sound and ductile joint was obtained.

Time and money will be saved if the properties of the dissimilar-metals weld can be predicted

before an actual test is made. Such a prediction is not difficult, because it is known from experience that the chemical composition and microstructure of the weld are major factors in controlling the cracking tendency and ductility of the welded joint. It is the purpose of this article to present a method¹ which permits the welding engineer to select the proper stainless steel electrode when called upon to weld new types and new combinations of dissimilar metals. Basically, this method permits the engineer to control the the chemical composition and microstructure of the weld deposit, thereby obtaining a sound and ductile joint. The method can be applied to the welding of clad steels and armor, as well as



FIG. 1



FIG. 2

with Stainless Electrodes . . .

By ANTON L. SCHAEFFLER

Metallurgical Engineer,
Arcos Corp.,
Philadelphia

° ° °

the superalloys used for jet propulsion.

Since the relationship between microstructure and chemical composition of the weld forms the basis for this method, the appearance of some

¹ Anton L. Schaeffler, "Selection of Austenitic Electrodes for Welding Dissimilar Metals," *Welding Journal*, vol. 26, No. 10, Research Supplement 601S-620S, October, 1947.

of these structures will be described. Fig. 1 shows a microstructure of 100 pct austenite, typical of a 25 Cr—20 Ni deposit. At room temperatures austenite is very ductile, but is sensitive to hot cracking at the grain boundaries under certain conditions of stress.

In fig. 2 a microstructure of austenite-plus-martensite is presented, typical of a weld containing about 13 pct Cr and 7 pct Ni. The more martensite present, the higher will be the hardness, the lower the ductility, and the weld may crack. Fig. 3 shows an austenite-plus-ferrite structure which is typical of a 19 Cr—9 Ni deposit. This type of structure is very resistant to hot cracking. Deposits from 29 Cr—9 Ni electrodes contain more of the ferrite phase, and in some instances may contain as high as 40 pct ferrite.

In order to compare the chemical composition of a weld deposit with its microstructure, a constitution diagram is required. Such a diagram,

FIG. 1 - Fully austenitic structure, typical of a type 310 weld deposit, containing 0.135 C, 25.25 Cr, 21.68 Ni, 1.24 Mn and 0.43 Si. 1000X.

FIG. 2 - Weld deposit having an austenite-plus martensite structure, containing 0.10 C, 12.72 Cr, 6.66 Ni, 2.04 Mn, 0.33 Si, and 0.90 Mo. 500X.

FIG. 3 - Austenite-plus 6 pct ferrite structure typical of a type 308 weld deposit, containing 0.065 C, 19.58 Cr, 10.01 Ni, 1.67 Mn and 0.36 Si. 500X.

FIG. 3

shown in fig. 4, reveals the general relationship between the chemical composition and the microstructure of as-deposited weld beads. It should be noted that the horizontal and vertical axes of the diagram are based upon a chromium equivalent and a nickel equivalent rather than upon chromium and nickel contents only. By making use of equivalent values most of the elements which affect microstructure can be taken into consideration. The chromium equivalent is a combination of the elements which are known to be ferrite forming (chromium, silicon, molybdenum and columbium) while the nickel equivalent is a combination of elements which

one or more base metals. The weld metal constitution diagram forms the basis for predicting the composition and microstructure of the resulting mixture. The composition of the base metals and the composition of the undiluted weld metal are located on the diagram and by drawing lines joining the weld metal and base metal points, the structure and composition of the resulting weld metal can be predicted. These lines have been termed *dilution direction lines* because they indicate the locus of compositions and structures possible with various amounts of dilution or weld metal penetration.

This concept of dilution direction lines can

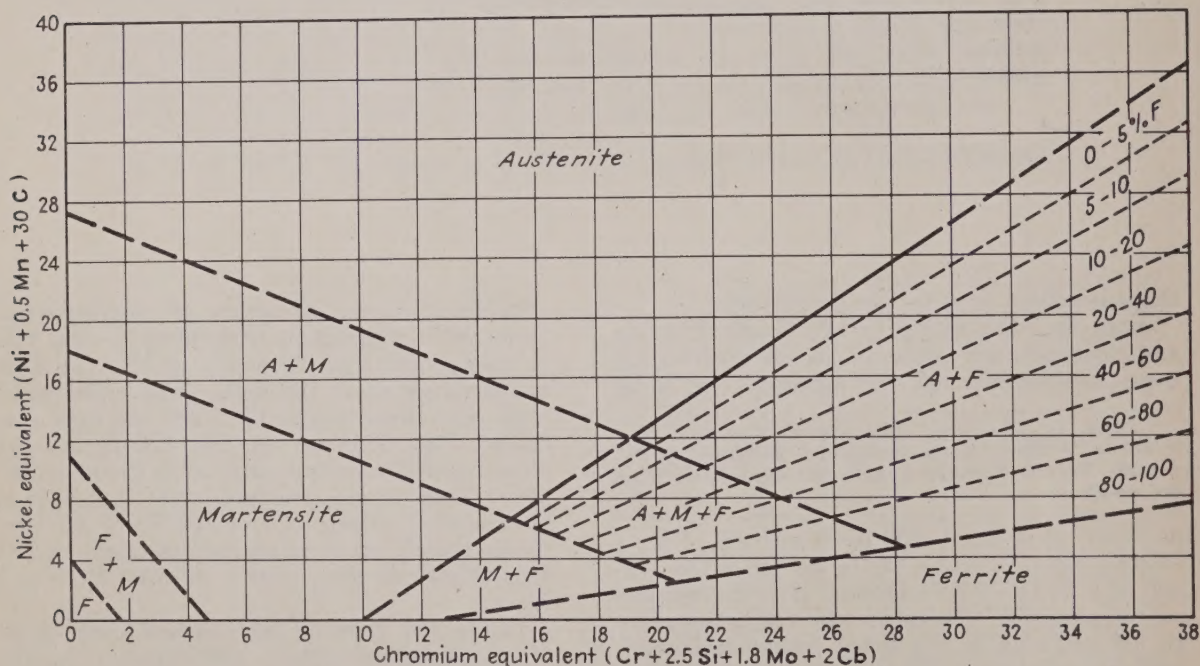


FIG. 4 - Tentative constitution diagram for chromium-nickel weld metal in the as-deposited condition. Probable limits of accuracy: 0—1 pct Si; 0—3 pct Mo; 0—1.5 pct Cb; 0—4 pct Mn; 0—0.2 pct C.

are known to be austenite forming (nickel, manganese and carbon). Each element is weighted with a factor which indicates its potency as a ferrite or an austenite former.

For example, when calculating the nickel equivalent, carbon is 30 times more potent than nickel and when calculating the chromium equivalent, molybdenum is 1.8 times more potent than chromium. To calculate the equivalent values, the percent of each element in the deposit is multiplied by its factor and the products in each group are added, thus forming the chromium equivalent and the nickel equivalent.

$$\text{Chromium Equivalent} = \% \text{ Cr} + 2.5 \times \% \text{ Si} + 1.8 \times \% \text{ Mo} + 2 \times \% \text{ Cb}$$

$$\text{Nickel Equivalent} = \% \text{ Ni} + 0.5 \times \% \text{ Mn} + 30 \times \% \text{ C}$$

Dilution Direction Lines

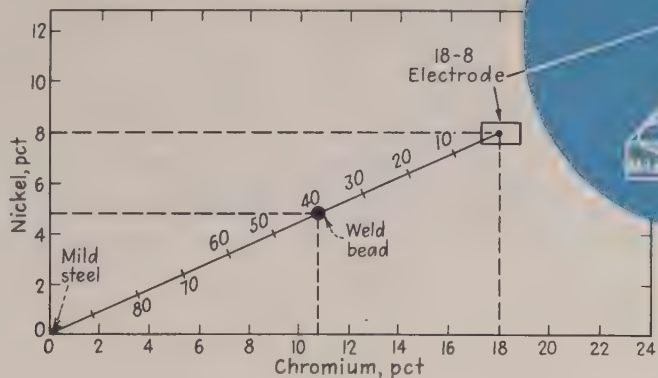
The welding of dissimilar metals invariably involves a mixture of electrode filler metal with

be more easily understood by drawing an analogy. The mechanics of dilution, when melting an electrode of one composition with a base metal of a different composition, are similar to the calculations used by a steel melter in calculating melt composition. In a charge consisting of 40 pct of 18-8 stainless steel scrap and 60 pct mild steel scrap, the percentages of chromium and nickel in the melt are determined with calculations as shown in fig. 5.

Diagrammatically, the same result could be achieved by locating the ingredients on a chrome-nickel diagram (fig. 5). By drawing a dilution direction line between the two ingredients the composition of the melt would be observed at the proper position on the line which represents a 40:60 ratio of the two ingredients.

In the simple example of a weld bead deposited on a plate (lower right hand corner of fig. 5), the welder has created a new composition by melting some of the mild steel base metal with an 18-8 electrode. If the penetra-

FIG. 5 - Diagrammatic determination of weld bead (melt) composition represented by calculations as follows: 60 pct 18-8 + 40 pct mild steel = melt; $0.6 \times 18 + 0.4 \times 0 = 10.8$ pct Cr; $0.6 \times 8 + 0.4 \times 0 = 4.8$ pct Ni. Interpretation of diagram based on: weld bead = total area = A + B; plate metal = 40 pct area = B; weld metal = 60 pct area = A.



tion (area A) represents 40 pct of the total weld bead (A + B), then the welder will have a weld bead composition corresponding to 40 pct dilution on the dilution direction line in the diagram. Superimposing this dilution direction line on a constitution diagram, the microstructure and the chemical composition of the weld bead can be estimated.

When the compositions of the materials being used are known only as alloy types, it is desirable to plot the range of possible compositions within the type as squares or rectangles, as is done in fig. 6. A type 310 (25-20) weld metal is usually fully austenitic in structure. When depositing 25-20 on a low alloy steel such as SAE 4340, the weld bead (location at 20 chromium

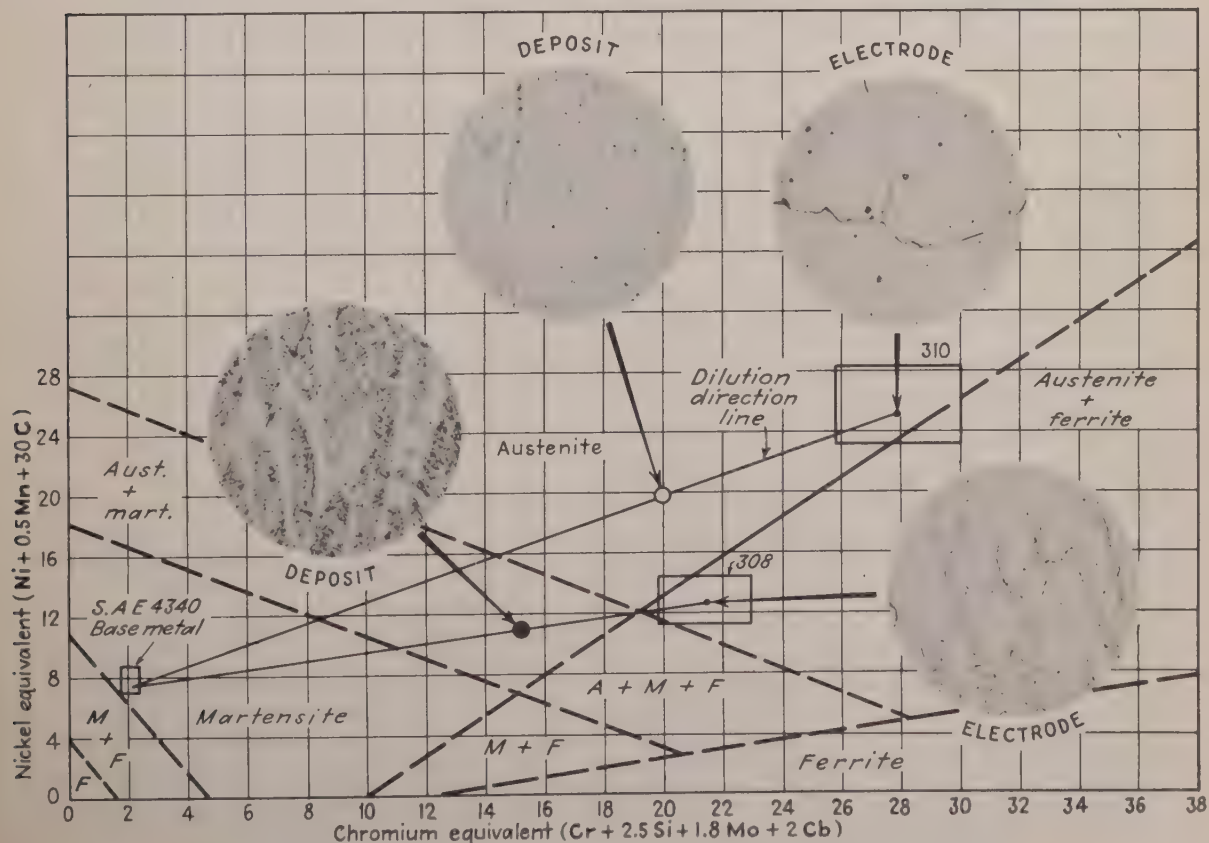


FIG. 6 - Dilution direction lines are used to predict the microstructural trend of the deposit when welding dissimilar metals. Diagram shows results when depositing types 308 and 310 on SAE 4340 base.

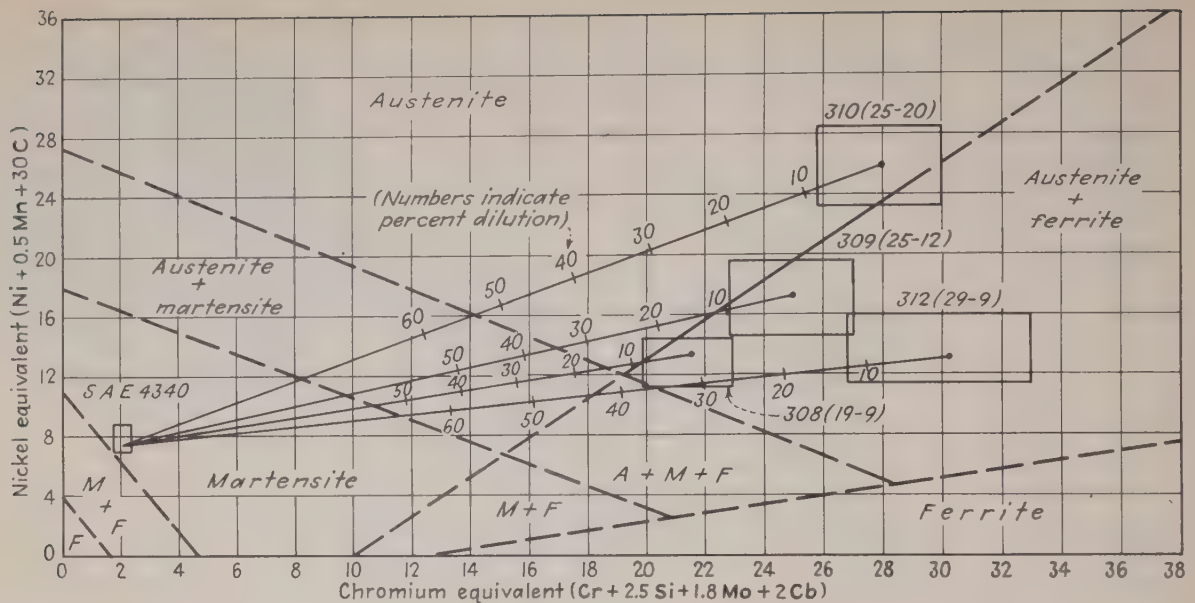


FIG. 7 - Dilution direction lines for several electrodes welded on SAE 4340 steel.

equivalent and 20 nickel equivalent) will also be fully austenitic as long as the penetration is not excessive. A type 308 (19-9) electrode usually has a microstructure of austenite plus ferrite. When deposited on 4340 steel, however, a very slight dilution causes the formation of a martensite-plus-austenite structure in the weld bead; higher values of dilution result in increasing

amounts of martensite, and a correspondingly higher hardness, and greater tendency for weld bead cracking.

In fig. 7, the dilution direction lines have been marked off to indicate the effect of various amounts of dilution or penetration. A type 308 electrode deposited on SAE 4340 plate may have a structure of either 100 pct austenite (8 to

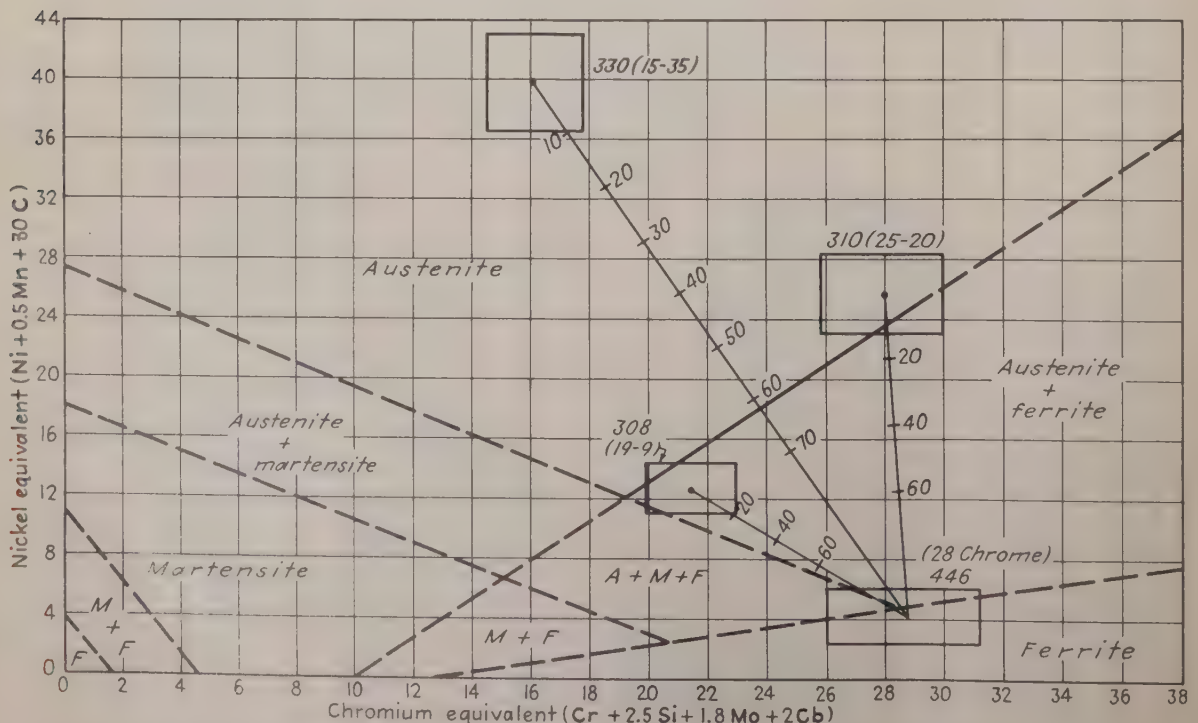


FIG. 8 - Dilution direction lines for several electrodes welded on 28 pct chrome.

14 pct dilution), or austenite plus martensite (14 to 60 pct dilution), or martensite alone (above 60 pct dilution). It should be observed that the exact percentage dilution limits will vary with the exact position of the undiluted weld metal within the type 308 rectangle.

Regardless of the exact composition of a type 310 electrode, a fully austenitic deposit will be obtained if the dilution is under 50 pct. A type 312 electrode will produce a structure consisting of austenite plus ferrite if the dilution is less than 35 pct when the exact composition of the weld metal is near the middle of the range.

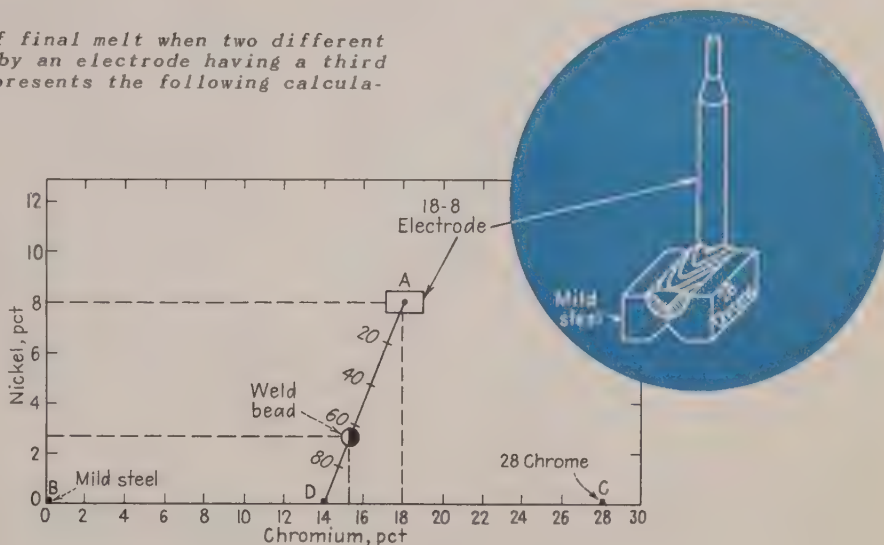
A small amount of ferrite in an austenite matrix is distinctly beneficial for the prevention of weld metal cracks. Under conditions of severe

if a fully austenitic deposit is desired. Types 310, 309, 308 and 312 electrodes will yield deposits having various amounts of ferrite.

Single Deposits Joining Two Base Metals

When two different base metals are to be joined by an electrode having a third composition, the problem becomes more complex. The analogy of the steel melter will again assist in gaining an understanding of the problem. If equal proportions of 18-8 scrap, 28 pct Cr scrap and mild steel scrap are being melted, the percentages of chromium and nickel in the final melt can be computed as shown in fig. 9. In making a butt weld as shown by the sketch in fig. 9,

FIG. 9 - Calculations of final melt when two different base metals are joined by an electrode having a third composition. Diagram represents the following calculations based on the relationship $1/3$ 18-8 + $1/3$ 28-Chrome + $1/3$ mild steel = melt; $1/3 \times 18 + 1/3 \times 28 + 1/3 \times 0 = 15.3$ pct Cr; $1/3 \times 8 + 1/3 \times 0 + 1/3 \times 0 = 2.7$ pct Ni.



restraint or severe notching, it is known that a 25 Cr—20 Ni (fully austenitic) weld deposit will crack, but under the same conditions, a 19 Cr—9 Ni (partially ferritic) deposit will not crack. The small amount of ferrite has a beneficial effect. If a certain amount of ferrite is desired, the diagram can be used as a first approximation in determining how much ferrite will be present when dilution is encountered. Since the direction of the dilution direction line for a type 310 electrode welded on a low-alloy steel is away from the austenite-plus-ferrite region, no amount of dilution (with mild or low alloy steel) will render the weld deposit partially ferritic. If a partially ferritic deposit must be obtained when welding on a low alloy steel, the best electrode is type 312.

Other base metals, like 12 pct Cr steel, 16 pct Cr iron, 28 pct Cr iron and Timken 16-25-6 alloy can be located on the diagram. The dilution direction lines are drawn from the electrode to the base metal and the results of dilution can be seen at a glance. In fig. 8, the base metal selected is 28 pct Cr iron. Type 330 (15 Cr—35 Ni) is the only electrode which can be used

wherein the two base metals are penetrated in equal amounts, the average base metal composition can be represented on the diagram by the midpoint D of line BC. The dilution direction line is AD, and if the weld metal represents one-third of the total "melt", the composition and structure of the deposit is shown by the point representing a dilution of 67 pct.

Variations in the degree of penetration will be observed by traveling along the dilution direction line. Further, the direction of the line may vary if conditions of welding or joint preparation were such as to favor the melting of one component more than the other. But, regardless of what degree of penetration is obtained or which base metal is favored, the composition of the newly formed weld bead must fall within the confines of an imaginary triangle described by points ABC.

Multipass Welds Joining Two-Base Metals

A similar approach is used on problems involving multipass welds joining two dissimilar metals. The composition and structure of each

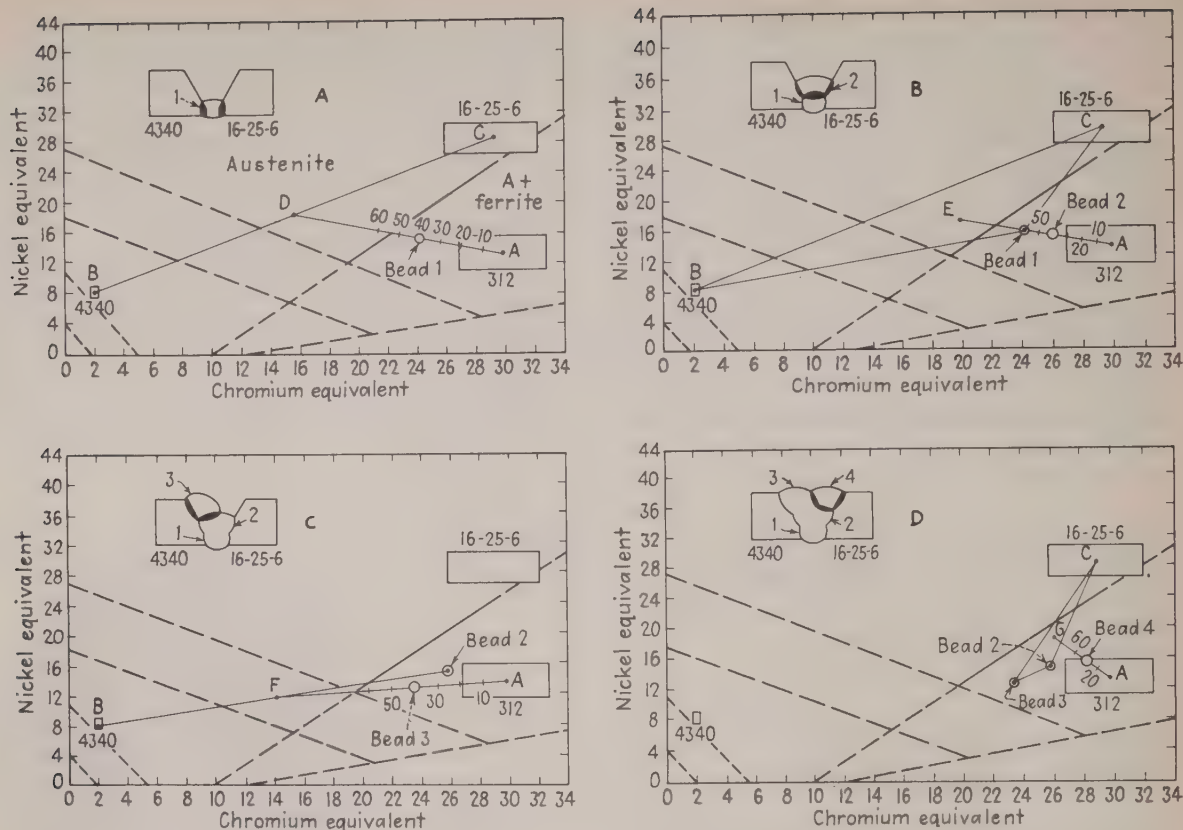


FIG. 10 - The determination of composition and structure of each weld bead when joining two dissimilar metals utilizing multipass welds.

weld bead must be determined separately as illustrated in the examples shown in fig. 10 (A, B, C, D).

One of the gas turbine rotor designs calls for the welding of an SAE 4340 hub to 16 Cr—25 Ni—6 Mo alloy rim using type 312 electrodes.

The root pass of a simplified butt weld using these materials is shown in fig. 10A. The two base metals, 4340* and 16-25-6 are located on the diagram and are joined by the line BC. The position of point D indicates that equal amounts

* The location of SAE 4340 and other base metals requires a word of caution. During welding, carbon may be oxidized and since carbon has a large factor (30) a considerable error may be encountered if the full amount of the carbon is used to calculate the nickel equivalent. Actual experiments have shown that under normal conditions about 15 to 50 pct of the carbon may be oxidized during welding and thus only 50 to 85 pct of the carbon is used in computing the nickel equivalent.

of the two base metals are melted by the electrode in the root pass. The dilution direction line is then drawn from the 29-9 weld metal composition (point A), to the apparent base metal location, point D. If 40 pct dilution occurs, the weld bead contains 24 pct Cr equivalent and 16 pct Ni equivalent and has a partially ferritic structure. If dilution is much greater than 40 pct, the weld bead will be fully austenitic and

cracks may develop in the root pass.

If the second pass covers the full width of the joint, fig. 10B, four components must be considered—bead 1, 4340, 16-25-6, and the 29-9 electrode. As before, the base metals are considered first, and for this purpose, bead 1 is classed as a base metal. Lines are drawn between the three base metals forming the triangle B-C-Bead 1. The relative amounts of the three base metals which are melted must be either estimated or known from experience and then these amounts can be used to establish the apparent base metal location, point E. In this case, the relative amounts of the base metals melted were judged to be: 50 pct bead 1, 25 pct 4340 and 25 pct 16-25-6. The remaining two beads are calculated using similar procedures and the mechanisms are illustrated in fig. 10 (C and D).

Most problems encountered in dissimilar-metal welding do not require accurate determination of the amount of weld metal dilution. As indicated previously, the dilution direction line gives a locus of compositions and structures obtainable with various degrees of dilution or penetration. The exact amount of dilution can be obtained experimentally by sectioning a weld and determining the relative area that the weld bead penetrates the base metal.

For bead-on-plate welds with the metal arc welding process using normal currents and arc voltages, the dilution will usually range between

25 and 40 pct. Metallic arc welding of root passes in butt welds usually results in dilutions ranging from 30 to 50 pct. Penetration will be substantially less in vertical welds than in flat or overhead welds. Automatic, submerged melt welds will usually have dilutions ranging from 40 to 75 pct. These figures may be used to guide the engineer in making his first approximation of the structure and composition of dissimilar-metal welds.

After using these diagrams a few times the

simplicity of the method will become apparent. It must be emphasized however, that this method is of greatest value, not for predicting the exact chemical analysis and microstructure of the weld, but for observing the trend that the new weld bead will follow when welding dissimilar metals. By observing this trend, the welding engineer or the metallurgist can select the proper stainless electrode when welding dissimilar metals, thus eliminating weld metal defects or failure of the welds in service.

Abrasive Blasting Speeds Pipe Cleaning

WITH thousands of miles of new pipe line under construction and with many more miles of old line being cleaned and reconditioned the problem of how best to prepare the surface of the pipe for its protective coating and wrapping is becoming one of paramount importance. Abrasive blasting with its intense scouring action and thorough removal of all foreign material from the metal surface has been receiving increased attention for this use and has proven its worth in many installations.

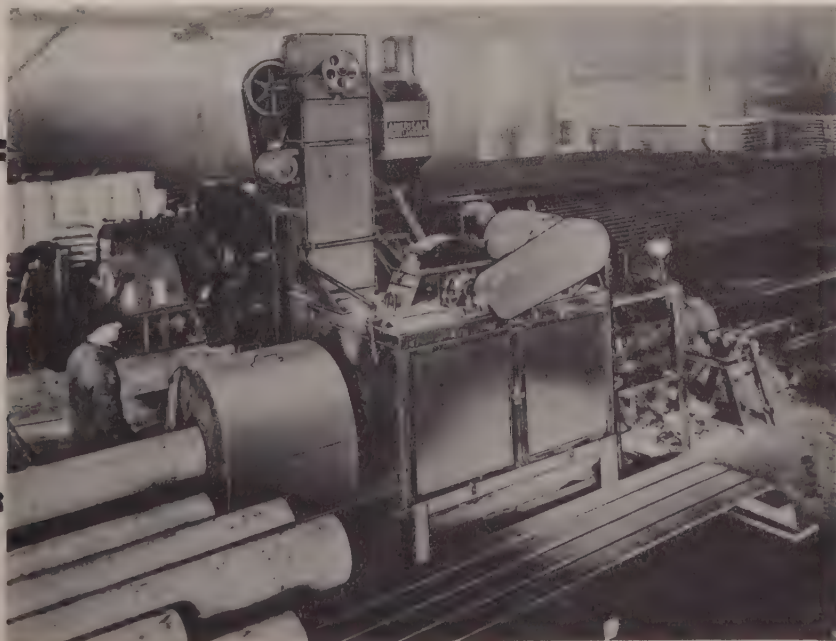
A typical pipe cleaning operation is shown in the accompanying illustration. This shows a cleaning operation in the plant of the Pipe Line Service Corp., Franklin Park, Ill. After being cleaned in an American Wheelabrator unit, the pipe is tarred, and is then ready for wrapping.

Complete, uniform cleaning coverage is provided by rotating the pipe as it passes through the abrasive blast. A specially designed conveyor system carries the sections of pipe on skewed disk rollers which impart a rotary motion as well as longitudinal travel.

The rate of cleaning in the average installation is dependent upon the surface condition of the pipe as it enters the blast cleaning machine as well as upon the pipe diameter. In the case of very badly corroded pipe which has been buried in corrosive soil for many years, the cleaning time is naturally considerably greater than on new pipe. Used 6-in. pipe has been cleaned at a rate of 22 ft per min., while the 10 in. and 12 in. sizes have a maximum cleaning rate, of approximately 14 ft per min.

New 30-in. pipe being used in the Biggest Inch pipe line is being cleaned at a rate of 1000 ft per hr, or approximately 16 ft per min.

Some pipe now being cleaned has been in corrosive soil for as long as 19 years and, as a result of the excellent bonding surface provided by abrasive blasting, it is estimated that an additional 6 to 10 years of life is being provided. Another very decided advantage of the use of abrasive blasting in reconditioning old pipe lies in the increased ease and accuracy of inspection as a result of the chemically clean surface provided.



French Alloy and Tool Steel Industry

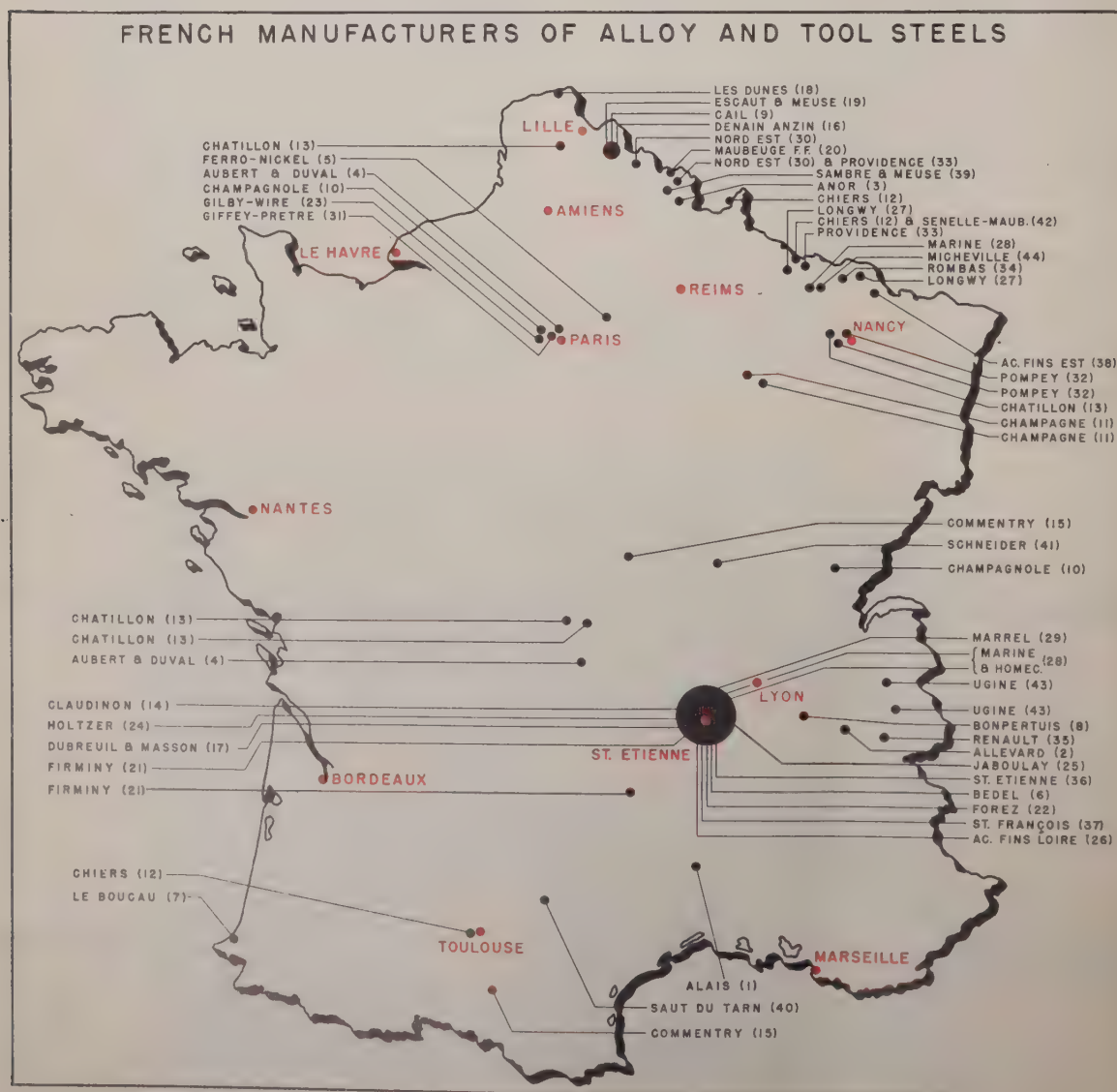
HISTORICALLY the alloy and tool steel industry in France has been a flourishing one and operations have been reestablished in the postwar period to the extent that current production is reported to be 120 pct that of 1938. Since most of these steels are produced in electric furnaces, production has not been impaired by coal shortages.

The accompanying map and list of companies, developed in cooperation with the *Chambre Syndicale des Producteurs d'Aciers Fins et Speciaux*, gives the exact locations of the major producers and the types of steel each specializes in.

Over 80 electric furnaces of the arc type, ranging in capacity from 5 to 50 tons, and more than 20 induction type furnaces, with capacities from 200 to 10,000 lb, are being used. There is also an important crucible installation near St-Etienne producing a full range of the various grades and sizes.

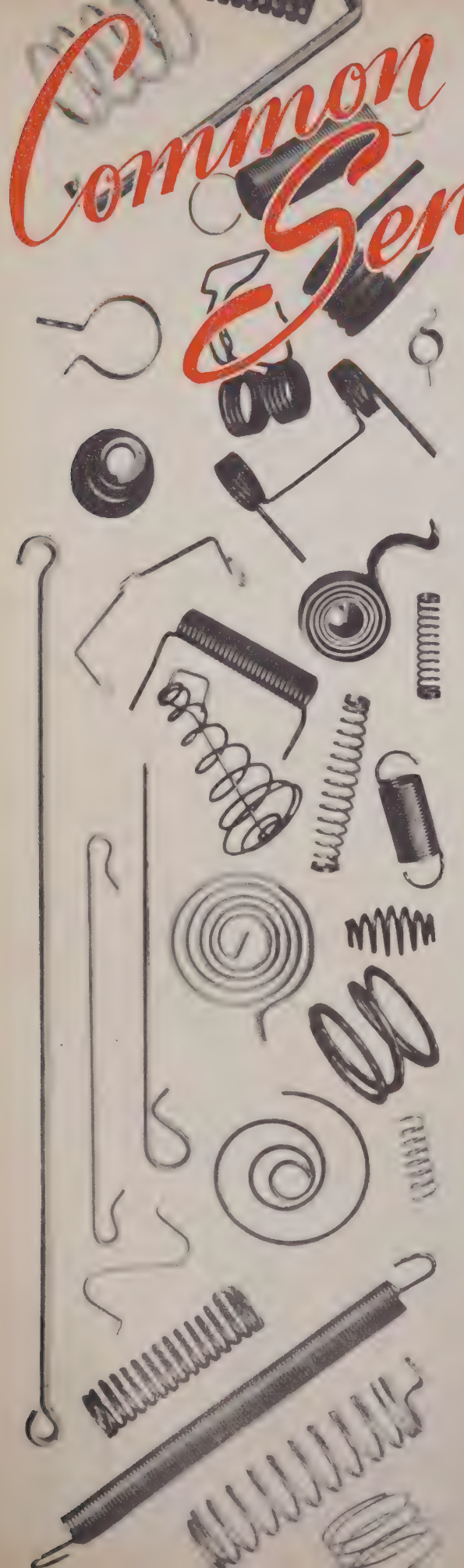
Approximately 60 alloys steels are used by French industry and standards have been established for them. These standards occupy the same position as AISI specifications in this country, and with two exceptions the analyses correspond closely to the grades in most common usage here. French steels are generally processed in smaller furnaces and are poured into comparatively small ingot forms.

The two grades having no apparent AISI counterparts are: (1) Air hardening nickel-chromium and nickel-chromium-molybdenum steels having chrome contents over 4 pct, which are used to make intricate parts where shock resistance is a factor. Special gears made from these steels are air hardened without deformation, so that grinding is unnecessary. And (2) straight manganese austenitic steel with an analysis of 1.5 pct C and 12 pct Mn for parts such as crusher jaws where exceptional shock and wear resistance are desired.



FRENCH MANUFACTURERS OF TOOL AND ALLOY STEELS

Company	Address	Types of Steel Produced	
		A—Production alloy steels B—Tool and high speed steels C—Stainless steels D—Bearing steels	E—Electrical steels F—Magnet steels G—Valve steels H—Cutlery steels
1. Forges d'Alais	2 Rue Lord Byron, Paris.	A, B	
2. Ste des Hauts fourneaux et forges d'Allevard	12 Rue de La Rochefoucauld, Paris. Works at Allevard (Isere).	A, B, C, E, F, H	
3. Forges d'Anor	Anor (Nord).	H	
4. Aubert et Duval	41 Rue de Villiers, Neuilly-sur-Seine (Seine).	A, B, C, F, G	
5. Ferro-Nickel	Lizy-sur-Ourcq.	E	
6. Bedel et Cie	St.-Etienne (Loire).	A, B, G	
7. Acieries du Boucau	12 Rue de La Rochefoucauld, Paris. Works at Le Boucau (Basses-Pyrenees).	A, B, H	
8. Forges et Acieries de Bonpertuis	Bonpertuis (Isere).	A, B, C, H	
9. Etablissements Cail	14 Rue Cambaceres, Paris. Works at Denain (Nord).	A, B	
10. Acieries de Champagnole	4 Rue Jules-Ferry, La Courneuve (Seine). Works at Champagnole (Jura).	A, B, G	
11. Champagne	St-Dizier (Haute-Marne). Works at Marnaval and Rachecourt.	A, H	
12. Ste Des Hauts Fourneaux de La Chiers	20 Rue de la Beaume, Paris. Works at Longwy-bas (M.-et-M.) and Vireux-Molhain (Ardennes).	A, B	
13. Cie des Forges de Chatillon-Commentry et Neuves-Maisons	19 Rue de La Rochefoucauld, Paris. Works at Neuves-Maisons (M.-et-M.), St.-Jacques, Montlucon (Allier), Commentry (Allier), and Isbergues (Pas-de-Calais).	A, B, C	
14. Ste An. des Etabl. Claudinon	Le Chambon-Feugerolles (Loire).	A, B, H	
15. Ste An. de Commentry-Fourchambault et Decazeville	84 Rue de Lille, Paris. Works at Imphy (Nievre), Mazieres (Cher), Decazeville (Aveyron), and Pamiers (Ariege).	A, B, C, D, E, G, H	
16. Forges et Acieries de Denain et d'Anzin	12 Rue d'Athenes, Paris. Works at Denain (Nord).	A, B	
17. Messieurs Dubreuil et Masson	Rouardes, Grand-Croix (Loire).	B	
18. Les Dunes	79 Rue de Monceau, Paris. Works at Les Dunes, par Dunkerque (Nord)	A, B	
19. Ste An. Escaut et Meuse	5 Rue Montchanin, Paris. Works at Anzin (Nord).	A, B, C	
20. Fabrique de Fer de Maubeuge	Louvroil (Nord).	A	
21. Ste An. des Acieries et Forges de Firminy	79 Rue de Monceau, Paris. Works at Firminy (Loire) and St-Chely d'Apcher (Lozere).	A, B, C, D, E, H	
22. Ste An. des Acieries du Forez	Rue Pierre Copel, St-Etienne (Loire).	B	
23. Societe Anonyme Gilby-Wire	29 Quai de la Marne, Rueil-Malmaison (S.-et-O.)	E	
24. Ets Jacob Holtzer	77 Rue de la Boetie, Paris. Works at Unieux (Loire).	A, B, C, E, F, G, H B	
25. Jaboulay	Terrenoire (Loire).	B	
26. Aciers fins de La Loire	La Bernarie, St-Etienne (Loire).	A, B	
27. Acieries de Longwy	103 Rue de la Boetie, Paris. Works at Mont-St-Martin.		
28. Forges et Acieries de la Marine et d'Homecourt	12 Rue de La Rochefoucauld, Paris. Works at St-Chamond (Loire) and Assailly (Loire).	A, B, C, H	
29. Ste An. des Etablissements Marrel Freres	96 Rue de la Victoire, Paris. Works at Rive-de-Giers (Loire).	A, B, H	
30. Forges et Acieries du Nord et de l'Est	Valenciennes (Nord). Works at Valenciennes (Nord) and Hautmont (Nord).	A, B	
31. Etablissements Giffey-Pretre et Cie	121-121 bis, Rue Haxo, Paris.	F	
32. Acieries de Pompey	48 Rue de la Boetie, Paris. Works at Pompey (M.-et-M.), Dieulouard (M.-et-M.) and Manoir (Eure).	A, B	
33. Ste An. des Usines de la Providence	14 Rue de la Pepiniere, Paris. Works at Hautmont (Nord) and Rehon (M.-et-M.).	A, B	
34. Ste Lorraine des Acieries de Rombas	12 Rue de La Rochefoucauld, Paris. Works at Rombas (Moselle).	A	
35. Regie Nationale des Acieries Renault	St-Michel-de-Maurienne (Savoie).	A, B, D	
36. Cie des Forges et Acieries de St-Etienne	12 Rue de l'Isly, Paris.	A, B, H	
37. Acieries de St-Francois	70 Rue de la Montat, St-Etienne (Loire).	A, B, C, H	
38. Ste An. des Aciers fins de l'Est	Hagondange (Moselle).	A, D	
39. Sambre-et-Meuse	Feignies (Nord).	A	
40. Forges et Acieries de Saut-du-Tarn	60 Rue de la Victoire, Paris. Works at St-Juery (Tarn).	A, B	
41. Schneider et Cie	42 Rue d'Anjou, Paris. Works at Le Creusot (S et L).	A, B, C, D, G, H	
42. Ste Metallurgique de Senelle-Maubeuge	Longwy-Bas (M.-et-M.).	A	
43. Acieries Electriques d'Ugine	10 Rue de General Foy, Paris. Works at Ugine (Savoie) and Moutiers (Savoie).	A, B, C, D, E, F, G, H	
44. Ste An. des Acieries de Micheville	Micheville (Meurthe-et-Moselle).	A	



Common Sense

of Spring Design

By RONALD F. POND

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SPRING design is considered a tough subject by many design engineers. The reasons for this are many, and costly. That this is true is indicated by the occasions where certain engineering departments regularly cudgel their collective brains in an effort to design products as completely devoid of springs as possible, for the simple purpose of avoiding trouble. That such efforts are extremely rare, and only partially successful, is fortunate both for the spring industry and for the general public, which likes the comforts and conveniences made possible through the use of springs.

As is probably true in any highly specialized field, those who have to deal only occasionally with spring design experience a variety of difficulties which stem from a comparatively few errors, and these errors are so common that any man has a right to consider himself either fortunate or gifted if he does not commit most of them at least once.

These errors fall into two classes: Those affecting function, and a more or less overlapping group affecting economy.

Errors Affecting Function: By far the most common error is the designing of springs with excessive stress. Down through the generations

spring-makers have been pleading for the adoption of two rules: (1) Always try to design with a safe stress, and (2) when in doubt about the proper stress level for a given spring, consult a spring manufacturer before the product design is completed.

Aside from those now rare instances where excessive stress in a spring can be attributed to a disregard of the Wahl correction factor, overstressing in springs occurs almost invariably as the result of insufficient space. Often, for

Good spring design is not difficult to achieve if certain simple, basic considerations are fully understood. Conversely, ignorance of these basic tenets can lead to the twin headaches of high spring cost and poor performance. In this article the author, drawing on extensive experience, discusses in simple language the common errors of spring design and gives a number of suggestions which will be exceedingly helpful to spring designers in assuring maximum performance at minimum cost.

important and compelling reasons, the smallest possible section of spring material is required to do work which properly could be expected only from a much larger section. It is as if a child were required to do the work of an adult, simply because only a child could wriggle into the small aperture provided.

In compression springs, high stresses occur most frequently where the spring must work inside a hole, and over a rod. Upon discovering dangerous stress in such cases, the designer should immediately explore the possibility of either increasing the size of the hole, or of reducing the rod diameter. The first of these alternatives is generally the most effective. Failing to do this he may well be jeopardizing the usefulness of the product, because of the breakage, or set (loss of load or tension) which may occur in the spring in spite of anything the wire producer and the spring manufacturer can do to prevent it.

Not infrequently, the requirement of a very low solid height is the basic reason for overstress in compression springs. This is most apt to be true in cases of springs with three coils, squared and ground ends, and a solid height which is low in proportion to the free length. Since a squared and ground compression spring can not well be made with less than three coils, the maximum wire diameter is the product of the division of the solid height by three. If the resulting section figures to an excessive stress, little can be done unless the diameter can be increased considerably, to an extent allowing either the use of a pair of springs, one working inside the

other, or a tapered compression spring capable of nesting to the desired solid height.

The use of flat wire wound on edge is a further possibility, which is feasible when the quantity of springs needed is certain to be large enough to absorb the high costs of the special tooling generally required. Also to be considered by the designer is the probability that the size of flat wire which may be computed will not be one which can be obtained in warehouses, making it necessary for the spring manufacturer to purchase it by special order to a mill, on a three or four month delivery basis.

Similarly, in extension springs, a very short free length is apt to result in a high stress, even though the diameter is not closely restricted. Where the coil diameter of an extension spring has to be limited so that it will not touch adjacent parts, it is sometimes possible to correct the situation by changing from centered loop ends to side loop ends, thus moving the main axis of the coil away from a part too close to one side of the body.

In torsion springs made from round or square wire, the limiting of the solid length of coil is the primary cause of overstress. Increasing the diameter sufficiently to accommodate the required developed length of the proper wire size is often not feasible because a sloppy fit on the bearing rod would result. Many firms have set up the practice of designing torsions of this type with a fairly large pitch, rather than specifying that the coils be close wound. Besides reducing friction, this design practice also makes it possible for the spring manufacturer to suggest an increase in the wire diameter, or an increase in the number of coils, when it is felt that the design stress is dangerously high. Such changes could then be made without necessitating re-design of adjacent parts.

Also to be considered among the errors of design causing excessive stress and breakage are the cases where too sharp bends and small radii result in dangerous stress concentrations. These faults occur most commonly in special ends on extension springs, in the arms of torsions, and in wire forms and springs made from strip, or ribbon steel. Good design calls for inside bend radii having ratios of three to seven (the radius should be three to seven times the wire diameter). Larger radii, naturally, are still more desirable. Where the ratio of wire diameter or thickness to radius is smaller than 3/7, breakage is likely, unless the load and deflection requirements are low for the material used.

Wherever there are important reasons for small radius bends, the designer will be very wise to make samples to prove the adequacy of the part before releasing final drawings. This policy is particularly important when the problem concerns a wire form, or flat spring, because the computations of actual stresses in these types of parts is subject to considerable error.

In addition to the group of errors resulting in excessive stresses, there are certain other mistakes in design which are so common as to demand mention here.

Numerous cases exist where a compression spring is designed with a high load rate per inch of deflection, and with the critical load point occurring under slight compression. Consider,

for instance, a spring which has to carry a certain load at a height 1.32 in. below its mean free height, and for which a free height tolerance closer than ± 0.010 can not be held with normal manufacturing practices. The actual deflection, in a production lot of springs, from actual free height to load height, will therefore vary from 0.021 to 0.041 in., making the holding of a close load tolerance at that point a practical impossibility.

A similar difficulty is encountered in extension springs which have to carry a specified load close to free length. This generally calls for high initial tension, and since more variance usually occurs in initial tension than is found in the load rate, such springs will be found to vary widely in load, with the variance aggravated by the variation in free length, as in the case of the compression spring previously described. Ideally, the critical load in a spring should not occur until after the spring has been deflected at least a third of its potential safe deflection.

Still considering extension springs, one oft-repeated warning warrants repetition. Never

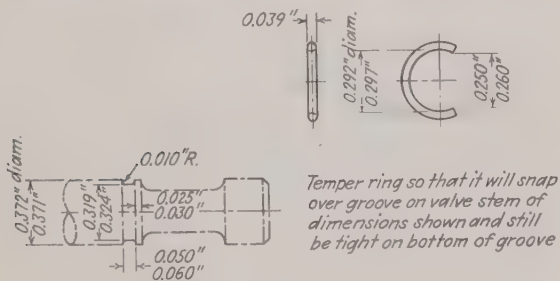


FIG. 1 - This drawing, showing mating surfaces, gives the spring manufacturers clear and complete information on the requirements of the part and the job it must do.

should extension springs be designed so as to be in free position at any time in the assembly. That is, they always should be under some amount of extension while in place, so there can be no chance of coil clash when returning to the fully retracted position. The following of this rule should also prevent the ends from accidentally slipping out of position on their bearings.

Returning to compression springs, many long springs of this type are designed without regard to buckling, a fault which, in active springs particularly, causes excessive wear and early failure, and sometimes undesirable load variation. This fault often can be corrected, space permitting, by a redesign to a different wire size and with a change in the number of coils. Where such changes cannot entirely correct the fault, wear may be minimized by the use inside the spring of a guide rod which has its diameter carefully selected to give maximum support to the spring without causing appreciable friction.

In the specifying of oil tempered spring wire, one of the commonest of spring wires, another danger exists. It is the application of an electroplated finish. Because of the large amount of hydrogen embrittlement which occurs in this material as a result of the plating processes, severe breakage may occur. Often such springs will fail under very slight deflection.

Some embrittlement occurs in the plating of most spring materials, but through careful heat-

treatment given the springs soon after plating, all dangerous embrittlement can be removed. Occasionally a lot of oil tempered wire can be put through the plating and heating treatment with satisfactory results, but the rule should be to avoid the combination.

In general, it can be stated that designers often specify plating on steel when better results could be obtained from materials which are inherently corrosion resistant, such as stainless steel, phosphor and silicon bronze, Monel, Z nickel, etc. Type 302 stainless, in particular, having tensile properties approaching those of carbon steel spring materials, offers much better service in highly corrosive conditions and should be considered, especially when a high temperature as well as a corrosive environment has to be dealt with.

Errors Affecting Economy: In listing errors affecting spring costs, one could very well start with the items included in the foregoing comments on functional errors.

Certainly, designing with excessive stress almost always increases spring prices because of the additional operations so often required in the production of such springs. The designer, of course, is seldom able to reduce stress without making changes in adjacent parts. But in weighing the cost of changes necessary to accommodate a *safe* spring, he should consider possible savings in several categories. Through the use of the proper spring, having a safe stress level, the cost of service calls, rejections and customers' complaints may be very greatly reduced. The cost of the spring itself may be reduced enough to offset the expense of the change. Many times a thorough-going space revision will result in the halving of spring cost, a saving built up by using a less expensive spring material, as well as through the elimination of an expensive operation in the manufacture of the spring.

Allied to the considerations of space and stress is the question of tolerances. In too many cases tolerances, both dimensional and load, are set according to the book, rather than as the result of a careful consideration of the function of the specific spring. In too many cases tolerances set are of a type which are suitable for machined parts, rather than mechanical elements made from spring temper materials. This point needs no emphasis to anyone who has experimented with the forming of a few springs in a home work shop or experimental laboratory.

Through the use of precision spring machinery, springs of certain proportions can be made with tolerances on certain dimensions of ± 0.002 in. In other springs a tolerance of ± 0.125 in. may be equally close. Every designer should have readily available a reliable chart of spring tolerances. Such a chart, developed by the Spring Manufacturers' Assn., is given in Table I.

There is one approach to the problem of dimensional tolerances which seems not to be well understood. It is based on the following fundamentals: A spring must first of all fit the space for which it is intended. It must be free to function without dangerous friction or wear. The ends of compression and extension springs, which might be called bearing points, must be of a size which will ensure a proper application of the force of the spring to the assembly as a

whole. The same is true of the main body of coils of a round or square wire torsion spring, as well as its ends. To obtain proper freedom of function, and satisfactory bearing points, the great majority of springs made need not be held to very close dimensional tolerances, such as ± 0.002 to 0.005 in. on diameters, or ± 0.010 in. on free length.

The critical factor in most springs is the force they will exert. Therefore, major emphasis in design should be placed on the determination of the correct load at the effective height, or position, of the spring. In many instances, springs have a maximum and a minimum load position, of equal or varying importance. If of varying importance, tolerances on the loads at the two positions should be determined separately, allowing a wider tolerance where a wider tolerance will not affect the proper functions of the spring. These tolerances can best be determined by using a tolerance table as a guide or reference, and then proceeding to fix the absolute limits by careful weight tests. If that is not possible, then the designer should obtain a set of samples which include a likely range of loads and by the trial and error method determine which of the samples will function properly. This may seem a time and money consuming procedure, but when large production runs are involved the ultimate savings in cost can be very substantial.

The point to be developed from the preceding two paragraphs is this: Determine exactly the load tolerances necessary at the critical load positions, state these tolerances explicitly on the blueprint, tying them to definite deflected positions, and then employ dimensional tolerances only for the purpose of insuring proper fit. An even better method is to include full space information on the blueprint, state calculated spring dimensions, and omit dimensional tolerances. On this basis, the spring manufacturer is made responsible for proper fit and is given the maximum opportunity to furnish the best spring possible at the lowest possible price.

Where it is not convenient to furnish space information by means of words and figures, the same results can be achieved by including on the drawing pertinent sections of mating parts, as illustrated in fig. 1. This latter practice should be considered very seriously, as it has proven of immense value in numerous instances, not only because of the correctness of the springs resulting from it, but because through it the spring manufacturer has been given the whole story of the application and job of the spring and has thus been put in a position to suggest improvements in design.

If the designer states his load requirements explicitly, and shows full space information, he need have no concern for dimensional variations. Given a load tolerance to meet, the manufacturer of the springs must necessarily hold the dimensional tolerances within a certain range, the actual, necessary range for the given spring, but not an arbitrary tolerance taken from a table.

Second to high stress as a design error affecting economy is the specifying of complicated ends on extension and torsion springs; this point applies naturally to complicated shapes in all types of springs. No space exists here for a

TABLE I

Mechanical Spring Standards

(Limits listed below are set to permit any spring to be manufactured at commercial cost; closer limits are possible, but may involve a higher cost.)

Manufacturing Variations—For coil springs made of wire up to and including 1 in.

* INDEX D/d.	Plus or Minus Variations in Diameter in Inches		
Coil Diameter, In.	** 4	8	12
$\frac{1}{8}$	0.0020	0.0030	0.0045
$\frac{1}{8}$ to $\frac{3}{16}$	0.0030	0.0045	0.0060
$\frac{3}{16}$ to $\frac{1}{4}$	0.0045	0.0060	0.0080
$\frac{1}{4}$ to $\frac{3}{8}$	0.0060	0.0080	0.0100
$\frac{3}{8}$ to $\frac{1}{2}$	0.0080	0.0100	0.0125
$\frac{1}{2}$ to $\frac{3}{4}$	0.0100	0.0125	0.0150
$\frac{3}{4}$ to 1	0.0125	0.0150	0.0225
1 to $1\frac{1}{2}$	0.0150	0.0225	0.0313
$1\frac{1}{2}$ to 2	0.0225	0.0313	0.0470
2 to 3	0.0470	0.0625	0.0938
3 to 4	0.0625	0.0938	0.1250
4 to 5	0.0937	0.1250	0.1560

WIRE DIAMETER VARIATIONS

Diameter range, in.	Tolerance, in.
up to 0.016	± 0.00025
0.017—0.062	± 0.0005
0.063—0.080	± 0.0010
0.082—0.104	± 0.0010
0.105—0.144	± 0.0015
0.145 and up	± 0.0020

Length variations in plus or minus per in. of spring (unfinished, not ground)

INDEX D/d	4	8	12
5 coils per in.	0.020"	0.030"	0.040"
10 coils per in.	0.030"	0.040"	0.050"
15 coils per in.	0.040"	0.050"	0.060"
20 coils per in.	0.050"	0.060"	0.070"

Squareness variations in degrees for ground end springs

INDEX D/d	4	8	12
5 coils per in.	$1\frac{1}{2}$ to 3°	2 to 4°	$2\frac{1}{2}$ to 5°
10 coils per in.	2 to 4°	$2\frac{1}{2}$ to 5°	3 to 6°
15 coils per in.	$2\frac{1}{2}$ to 5°	3 to 6°	$3\frac{1}{2}$ to 7°
20 coils per in.	3 to 6°	$3\frac{1}{2}$ to 7°	4 to 8°

Coil variations in plus or minus

4 coils to less— $\frac{1}{4}$ coil	8 to 15 coils— $\frac{3}{4}$ coil
4 to 8 coils— $\frac{1}{2}$ coil	15 to 25 coils—1 coil

*D/d: D signifies outside diameter of coil. d signifies diameter of wire.

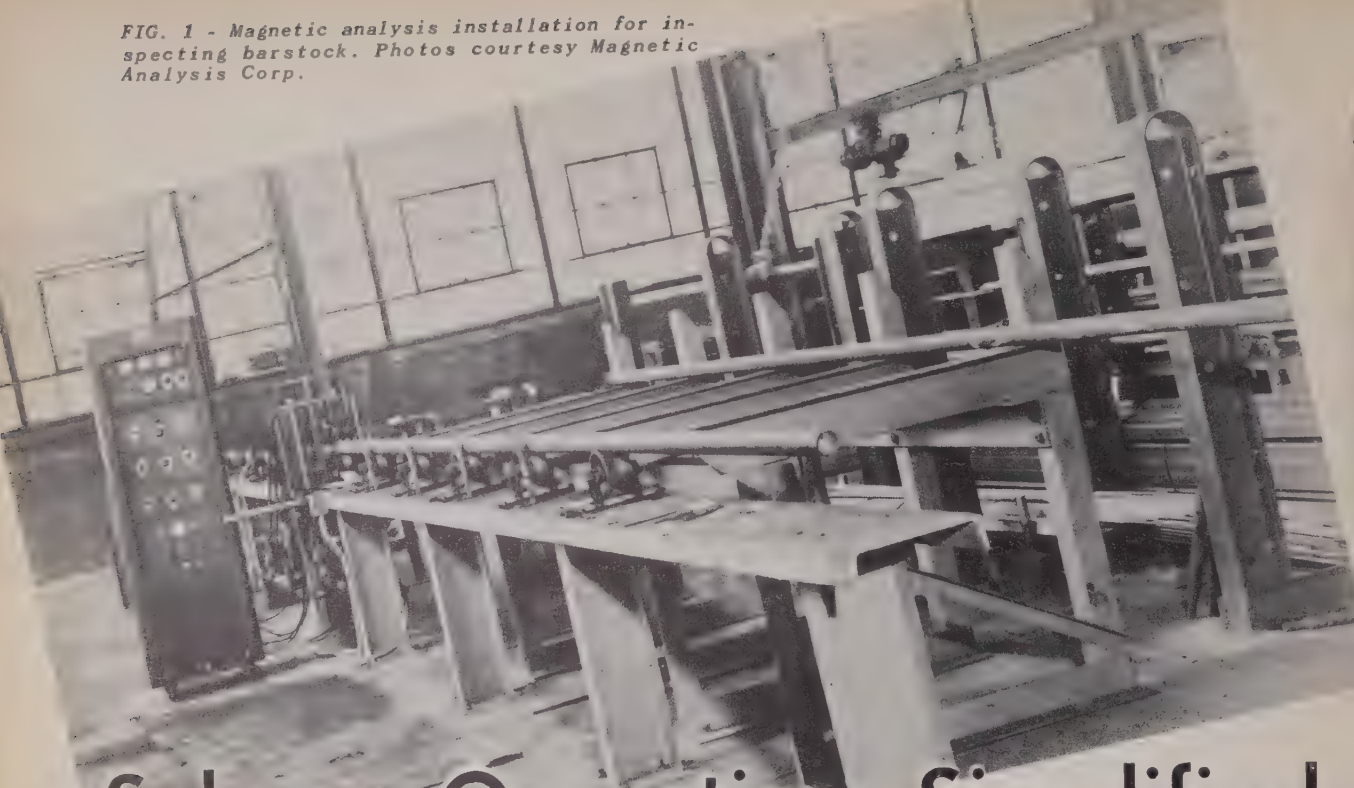
**4-8-12 signifies the ratio that is to be used to the nearest approximation. Example:—D/d 4 means a coil diameter of 4 times the wire diameter, and may be used in cases ranging from 3 to 6 times the wire diameter, 8 would then cover diameters of 7 to 10 times the wire diameter, and 12 covers coil diameters from 10 to 12 times wire diameters.

discussion of design details, but this much should be stressed: *Simplicity in design pays dividends.*

In complicated ends and shapes there lurks still another menace to the profit margin. When such springs are designed, and electroplating is specified, the designer is apt not to foresee what will happen to the parts in the plater's barrel.

(Continued on page 93)

FIG. 1 - Magnetic analysis installation for inspecting barstock. Photos courtesy Magnetic Analysis Corp.



Salvage Operations Simplified

By ARTHUR D. STOUT, Jr.

Associate-Editor,
THE IRON AGE

SEPARATION of mixed steel grades in a variety of salvaging jobs has been speeded and simplified by the use of magnetic analyzers which rapidly determine differences due to chemical composition. In addition, the instruments are applicable to hardness or machinability measurements, where variations of 2 or 3 points Rc have been distinguished, and to routine inspection for surface and subsurface flaws.

Sorting of 100,000 lb of Nitralloy and high carbon billets was accomplished in 1½ days at a mill where production was disrupted when mixture of the two grades was discovered after processing had begun.

In another application, a coil straightener operator suspected different characteristics in an order of wire rods which were supposedly of C1042 grade. Spark tests bore out the suspicion, showing some high carbon material which turned out to be a 1065 composition. The 38,500-lb order was rapidly sorted, however, using a magnetic analyzer and the interruption to production was minimized.

In checking machinability or hardness, the in-

struments have been found especially valuable for bar and rod measurements where it is not economically practical to run a succession of Rockwell or Brinell tests along the length of the work. Routine setups, similar to that in fig. 1, which shows equipment made by Magnetic Analysis Corp., Long Island City, N. Y., allow rapid testing along rod and bar lengths and in a typical application, where machining troubles with heat treated bars were being encountered, proved that nonuniformity along the length of the bar was the source of trouble. In this application, the pieces showed correct hardness at the ends but tended to exceed specifications in the center so that only overall tests were meaningful.

For flaw detection, magnetic analysis has been found to lower inspection costs and to reduce claims on defective material in certain applications, notably the final inspection of bars, tubes and shapes.

Internal defects, similar to the seam in the bar of 1¾ in. SAE 3135 steel shown in fig. 2, can be revealed by magnetic analyzers where frequently visual inspection or even cutting and

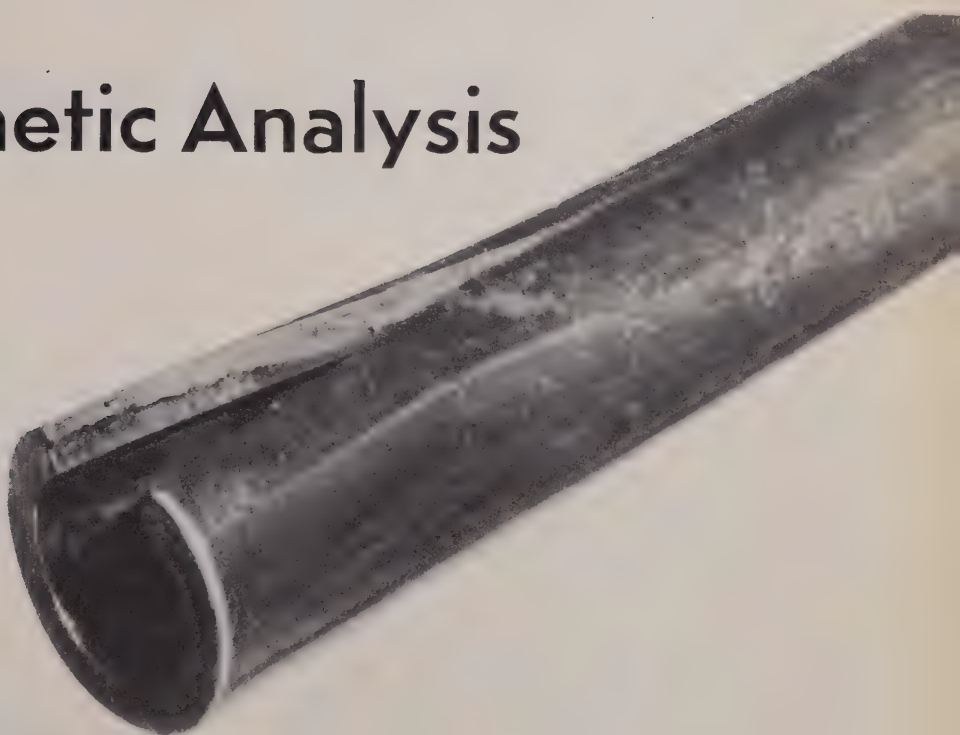
Magnetic analyzers which are able to establish differences in chemical composition very rapidly are finding profitable use in salvage operations to simplify separation of mixed steel grades. Use of the instruments in inspection work and in measuring hardness or machinability is also described in the article. Detection of surface and subsurface flaws is also covered.



FIG. 2 - Existence of the internal seam, indicated by arrow, in this section of barstock was discovered by magnetic analysis.

by Magnetic Analysis

FIG. 3 - Section of butt-welded tubing was forced open by cone test after magnetic analyzer had revealed incomplete weld.



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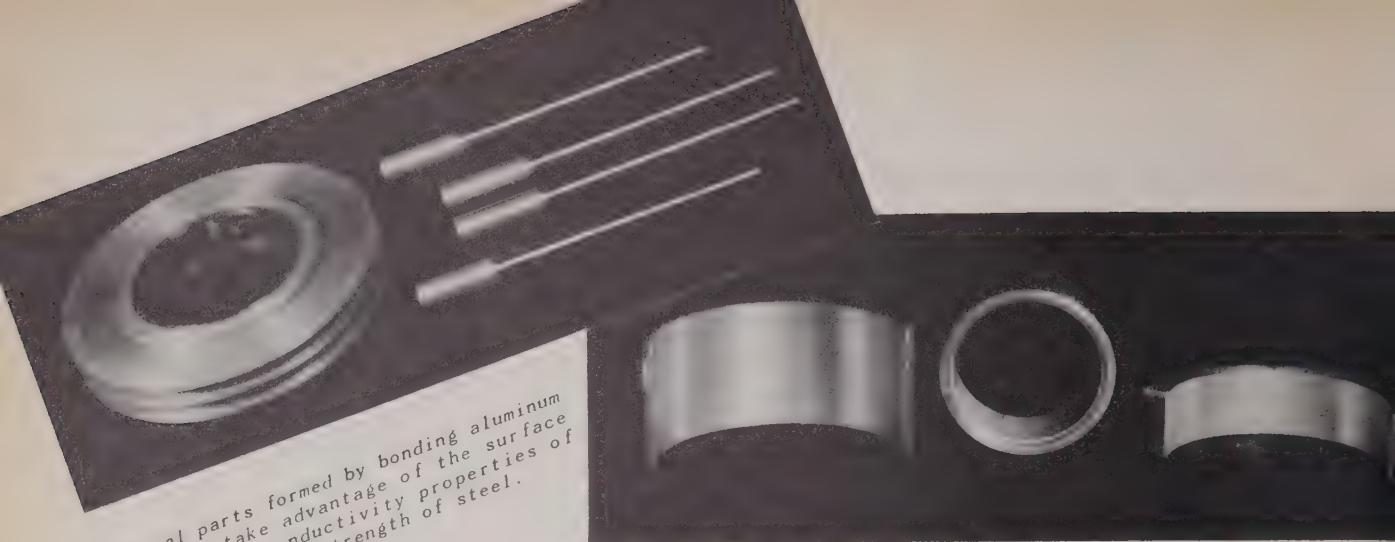
etching of the piece would fail to spot the imperfection. Routine magnetic testing of the overall length of high grade wire rods has been found to locate cracks, seams and pipes as well as the defects caused by cold working.

In steel tube manufacture, the instruments are used to inspect seamless tubing for the same flaws as in barstock, and butt-welded tubing is checked for defective welds and for burns. Fig. 3 shows a section of tubing forced open by a cone test to reveal an incomplete weld first spotted by magnetic analysis.

For production scale installations, an inspection coil, an indicator assembly, a demagnetizing unit and suitable materials handling facilities are required. The inspection coil is operated

from a constant voltage source, generally supplying 110 v. 30 cycle, ac current, which is also used to energize the electronic elements of the indicator. Indicator assemblies are normally capable of being used both for defect detection and for uniformity testing in which variations in physical, chemical and structural properties affecting magnetic characteristics can be registered.

Residual magnetism in test pieces is removed by passing the material through a demagnetizing unit having a separate alternating current field upon which is superimposed an adjustable unidirectional magnetic field of sufficient strength to neutralize the effect of other magnetizing forces.



Typical parts formed by bonding aluminum to steel take advantage of the surface and thermal conductivity properties of aluminum and the strength of steel.

Bonding Aluminum to

ALUMINUM bonded to other metals is finding wider use in the design or redesign of products, since in such composites it is often possible to take advantage of the superior properties of each metal. Aluminized steel, for example, offers the advantages of an aluminum surface layer together with the structural strength of steel.

In the field of cast products, steel cylinder barrels, fig. 1, are provided with aluminum fins to improve aircraft engine performance, and similarly, aluminum alloy timing gears with bonded-in steel hubs, fig. 2, are used in the automotive industry as a part of a camshaft assembly.

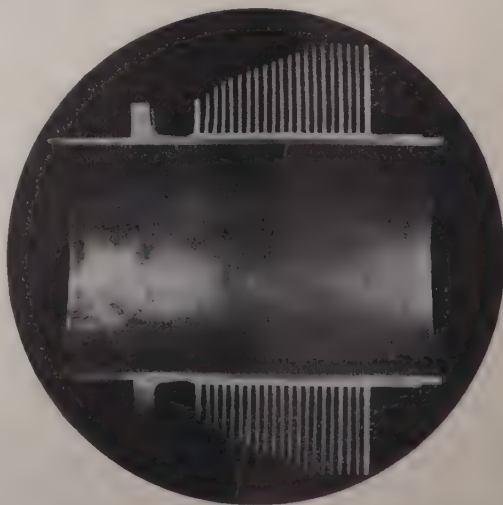
Other applications of bonded assemblies are radio transmission power tubes with aluminum fins for air cooling, pistons of bimetallic construction, cast iron space heaters with extended surfaces of aluminum, cooking utensils, steel backed aluminum alloy bearings, aluminum cylinder blocks with ferrous liners, hydraulic couplings, composite brakes and aircraft engine pre-combustion chambers, fig. 3.

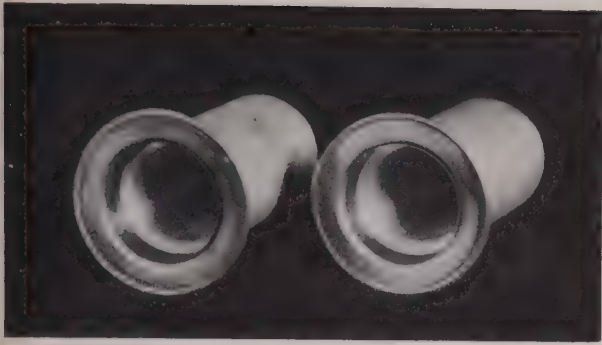
The forming of bonded aluminum-steel assemblies is usually a two step operation. The first step is to coat the ferrous section with tin, zinc or aluminum and the second step is a casting operation.

It has been found that in most cases involving bonding of nonferrous to ferrous metals it is necessary to create an intermetallic bond at the interface of the two metals to actually hold the

sections together. Although in some cases it is possible to make a satisfactory bond without initially pretreating the surface, it is recommended that the precoating practice be followed to insure consistent performance and quality of the product. In the case of the first two metals,

FIG. 1 - Cutaway section of aluminum finned cylinder barrel shows the point of bond.





By M. G. WHITFIELD

and

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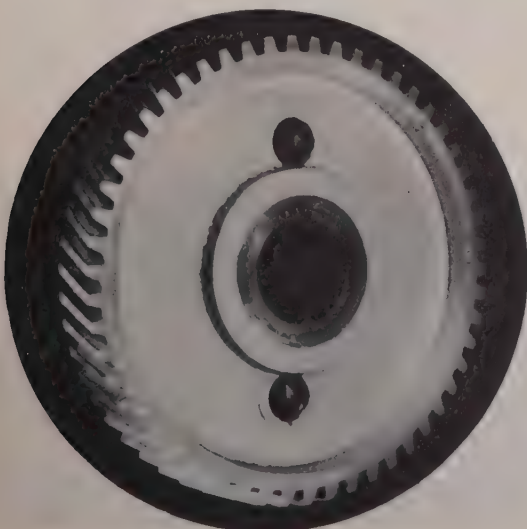
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Ferrous Metals

Bonded composite metals, which combine and take advantage of the best properties of the metals involved, are being used with increasing frequency. This article discusses the processing techniques and design factors involved in bonding aluminum to ferrous metals by casting operations. A method of assembly in which aluminum sheet is brazed to steel or cast iron parts is also described.

tin and zinc, their relatively low melting point and low latent heat of fusion, as compared with aluminum, make their solution in the aluminum casting almost inevitable. Also, in the case of zinc, since a number of aluminum alloys carry a certain amount of zinc as an alloying ingredient

FIG. 2 - Aluminum alloy gear with a bonded-in steel hub, used in an automotive cam-shaft assembly, is shown.



or as an impurity, the introduction of a small additional quantity of this metal is not harmful for many applications as it is usually well dispersed. Low melting metals are commonly used for bonding-in bushing inserts. Figs. 4 and 5 are micrographs of typical bonded sections. Fig. 4 shows a cast iron-alloy aluminum bond and fig. 5 is of aluminum fixed to a low carbon steel tube.

In processing, one of the important factors to be kept in mind is bond control. A thick bond at the interface of the two metals tends to lower the fatigue strength of most steels materially, and for this reason present practice in the manufacture of cylinder barrels for aircraft engines is to hold the bond thickness to a minimum. However, for the majority of applications any of the bonding metals will produce interfaces strong enough for all but a few special products. Silver and cadmium have also been used but cost considerations rule out commercial applications.

The casting operation may be carried out in the usual manner using either permanent mold or sand methods of casting. However, whenever possible, the permanent mold technique is recommended for the production of composite castings. It affords more accurate positioning of the insert and also allows the use of heavier sections which in some cases would be difficult to support in sand.

Another factor favoring the use of metal molds is the possibility of utilizing outside cooling

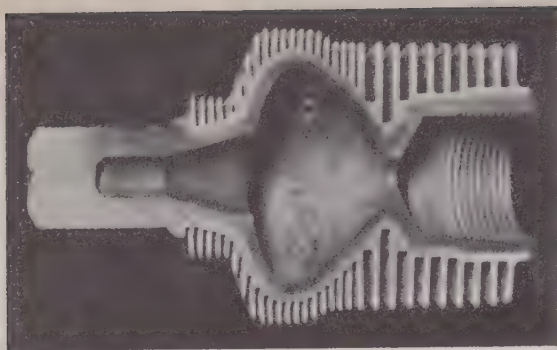


FIG. 3 - Experimental precombustion chamber shown has a somewhat more intricate shape than the part in fig. 1, but was formed by identical processes.

media such as air, water or oil to control the freezing rate of critical sections of the casting. Thus, with a properly designed mold, it is entirely feasible to make castings out of commercially pure aluminum without shrinkage in the casting proper and using a very low metal head. There are, too, the inherent advantages of permanent mold practice of finer grain structure, higher strength and economy.

When sand cores are used for the manufacture of bimetal assemblies extreme care must be exercised in placement of the insert in the sand mold. There is always a possibility of loosening some sand particles which may become trapped in the casting and cause trouble in subsequent machining operations. From the casting standpoint, changes in the rate and direction of solidification usually necessitate some modifications in locating gates and risers. Much the same comment can be applied to permanent mold work.

In the diecasting industry, the use of inserts is very common. In normal practice the surface of the insert is knurled so that the piece is held in a casting mechanically. Occasionally some of the low melting surface coatings are used to give better adhesion.

The important factor in diecasting is the very short solidification period which may not allow complete absorption of the precoating metal in the casting proper and may result in a weak joint as compared with permanent mold practice. By modifying the bonding procedure it is possible to overcome this potential weakness through the use of an aluminum coating on the surface of the inserts. Knurling can be eliminated as the bond possesses sufficient strength to keep the insert in place.

In concluding the discussion on molding of composite castings, the practice of machining, rather than casting, fins on symmetrical barrels should be mentioned. Since the spacing is frequently from 6 to 8 fins per in. as in fig. 6, with fins anywhere from 0.020 to 0.030 in. in thickness and from $\frac{1}{2}$ to 1 in. or more in width, the casting of such fins in either a permanent or a sand mold would present a formidable problem. On the other hand, it is a simple matter to cast a solid muff around the barrel section and machine the fins to the required dimensions. The total machining time depends on the diameter of cylinder and fin dimensions but averages less than 3 min.

Heat Treatment

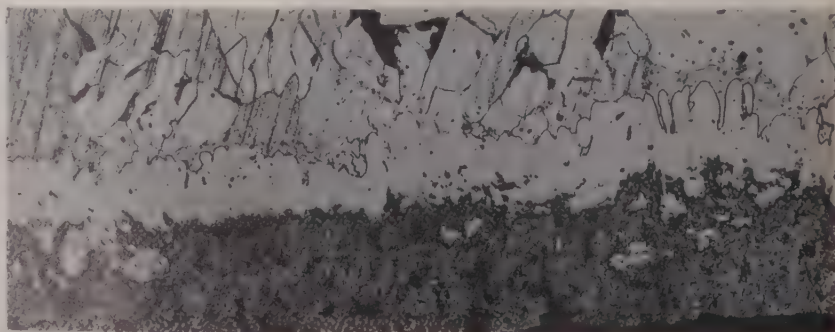
A number of bimetal assemblies require heat treating following the cast operation. Although complete information on the effect of heat treatment on the various cast assemblies is not available, it is known that some bonded bimetal constructions have successfully withstood testing temperatures as high as 1000°F. In aircraft engine applications, temperatures of 500° to 600°F are not uncommon. However each specific application has to be carefully analyzed from the standpoints of design and aluminum alloy selection. In some cases of poor design where strong aluminum alloys of low ductility were used, stresses high enough to rupture the aluminum section of the assembly were set up. This emphasizes the need for careful design in which not only the processing requirements but also the ultimate function of the part is kept in mind.

Heat treated parts exhibit the usual physical properties of such castings and do not show any reduction in the strength of the bond on alternate heating and cooling. In the case of unbonded sections, the parts eventually loosen up and either fail or drop off in efficiency of operation. For example, an unbonded cylinder sleeve after a period of time will show an accumulation of dirt and other foreign matter between the two sections with the result that a cylinder may develop hot spots and lower overall heat transfer. Another example is that of an aluminum alloy timing gear with a steel hub. When the heat treated gear with unbonded hub is subjected to a push-out test it shows a decrease of over 80 pct in its strength, whereas the bonded gear similarly tested shows a marked increase in strength.

Processing Equipment

Equipment used for processing composite cast-

FIG. 5 - Photomicrograph of aluminum alloy bonded to low carbon steel tubing. Nital etch. 250X.



ings is of standard aluminum foundry type. Some additional equipment may be required depending on the scope of the operation as to volume and variety of products.

Insofar as furnace equipment is concerned all types, electric, gas or oil fired, will give satisfactory performance. However, from the operator's standpoint, the electric furnace is definitely favored over the other types because of the absence of exhaust gases which are usually present in most gas or oil fired furnaces near the top of the crucible.

There are three types of electric furnaces available for this work—the resistance, induction and salt bath types. All are suitable although in some cases operating requirements may favor one type over the other. For small work the resistance furnace is one of the cheapest and is perfectly satisfactory. For large work and high production schedules, the new salt bath furnaces show excellent possibilities. The induction furnace because of its high melting capacity and special advantages in the melting of alloys is frequently used in conjunction with the other types.

Handling tools, racks, fixtures and other implements always constitute a problem where molten metal is involved. The tendency to oxidize and scale away, to alloy, and eventually to dissolve forces the operator to set up a schedule of periodic inspection and treatment in order to maintain an economic life of the tools. A tank of cleaning solution in which all handling tools may be stripped of accumulations of coating metals helps materially to retard the progressive deterioration. The tools, which are normally made of mild steel, usually are rinsed in hot water and dried before using again. A protective coating is applied to minimize the corrosive action of molten metal.

Design Factors

As pointed out, the majority of bonded composite castings have to be carefully designed to avoid difficulties in processing as well as in subsequent use.

One of the most important design factors in the bonding of dissimilar metals is the difference in thermal expansion characteristics of the metals involved. Table I gives the coefficients of thermal expansion of some common metals.

Examination of this table shows that the thermal expansion of aluminum is about twice that of steel and that the aluminum-silicon alloys begin to approach stainless steel in expansion char-

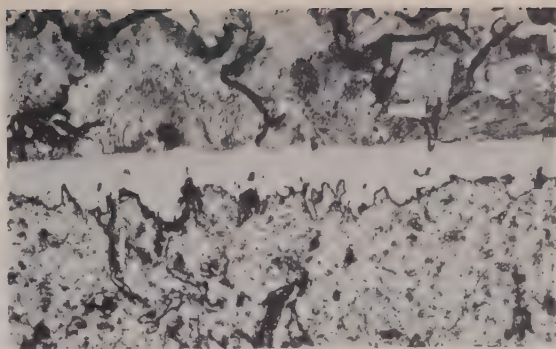


FIG. 4 - Photomicrograph shows cast iron-alloy aluminum bond. Nital etch. 250X

acteristics. Most of the common alloys have been successfully used in one application or another.

Thermal expansion, tensile strength, yield strength and elongation of the material all play an important part and must be carefully considered in determining the proper thickness of section if difficulties due to distortion are to be avoided. Stress analysis of the composite assemblies has presented quite a problem; however, a considerable amount of work has already been done with some of the fundamental sections and the data are of help in new designs.

Experience and practice should not be underrated in this work. For example, in the case of cylinder barrels, the barrel with a solid aluminum muff showed considerable constriction around the center, an "hour glass" effect caused by the contraction of the heavy mass of aluminum as the casting was cooled. This distortion was corrected by removing much of the aluminum during the finning operation. As metal was removed the steel sleeve was found to reassume its shape.

Pure aluminum offers a distinct advantage in many heat transfer applications such as cylinder barrels for internal combustion engines and heat exchangers of various kinds. For illustration, table II shows the thermal conductivities of a few common metals and alloys.

The advantages in the use of metal having a high thermal conductivity for heat transfer applications are apparent and, in the case of aluminum and aluminum alloys, it is possible also to effect a substantial saving in the amount of metal used.

The factor of next importance is the inter-metallic bond at the interface of the two metals.

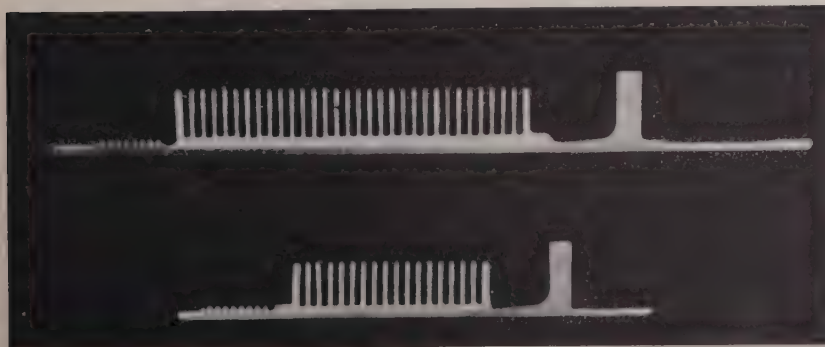


FIG. 6 - Fins on this cylinder barrel were machined from a solid muff of aluminum cast around the steel barrel section.

This bond plays an important role in heat transfer applications as well as in holding the assembly together.

Although the bonds are usually brittle they possess great compressive strength and may have a hardness in excess of 60 RC. The tensile strength of the bonded assembly depends somewhat on the method of testing and on the thickness of the bond. One of the more reliable ways to measure bond strength is to take one half of the regular tensile bar and cast on the end a section of aluminum alloy. The whole is then machined to form a standard tensile bar one half of which is ferrous and the other nonferrous. Values obtained with specimens of this type show a bond strength around 10,000 to 12,000 psi.

The actual thermal conductivity of the bond has not been determined, but measurements of heat flow through a composite bar, one half of which is steel and the other half aluminum, joined at the center by a typical bond zone show no measurable drop in temperature across the bond.

Another important design factor is fatigue resistance. It is known that too thick an alloy bond materially lowers fatigue strength of the steel. Assemblies which are subjected in service to stresses conducive to fatigue type failures must have the bond properly controlled as to both uniformity and thickness. To a large extent, the fatigue strength of most of these assemblies depends on the hardness of the ferrous base. Table III shows the effect of galvanized and hot aluminized coatings on the fatigue strength of steel and the extent to which it is influenced by the hardness of the material.

In production, bond thickness ranges from less than 0.0004 in. to as much as 0.002 in., depend-

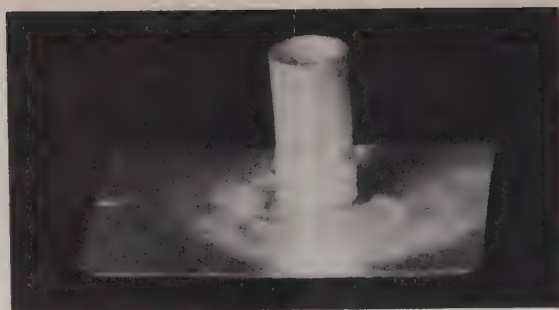


FIG. 7 - Extended aluminum surface, to enhance heat exchange, has been brazed to an aluminum coated steel pipe.

ing on the application and physical properties required. For example, a highly stressed part such as a bearing shell or an aircraft cylinder barrel would be processed so as to create the thinner bond, whereas an aluminum alloy gear with a steel hub performs satisfactorily with the heavier bond.

Since processing of bimetal assemblies involves subjecting the ferrous part to elevated temperatures it is helpful to know the effect of such treatment on the physical properties of the steel. Each procedure was checked with time-hardness-temperature charts, metallographic studies, Izod, tensile and fatigue tests. One interesting phenomenon observed with SAE 4140 steel was that whereas the hardness of the steel dropped from 33 to 32 RC and the tensile strength and yield strength were but slightly affected, the Izod impact value increased by more than 50 pct with somewhat smaller increases in the elongation and the reduction of area values.

In general it can be said that with a few exceptions the majority of steels and irons can be processed satisfactorily and desired properties obtained, or retained as the case may be.

Brazing

It is of interest to mention another relatively new type of assembly which consists essentially of brazing aluminum sheet to steel or cast iron parts which previously have been given a coating of aluminum. Using this method, a steel pipe

TABLE I

Coefficients of Thermal Expansion of Various Metals

Metal	Coefficient of Thermal Expansion per °F x 10 ⁻⁶ in the temperature range from 68° to 212°F
Steel,	6.0 to 7.0
Cast iron	5.9
Stainless steel, 18-8	9.5
Copper	9.3
Aluminum, 99.4 pct	13.1
Alcoa 43 alloy	12.2
Alcoa 142 alloy	12.5

TABLE II

Thermal Conductivity of Various Metals

Metal	Thermal Conductivity at 77°F in CGS Units	Thermal Conductivity per Unit Weight
Silver	1.00	1.00
Copper	0.90	1.06
Steel	0.11	0.15
Aluminum, 99.4 pct	0.53	2.05
Alcoa 43 alloy	0.35	1.37
Alcoa 142-T61 alloy	0.31	1.16

TABLE III

Effect of Galvanizing and Aluminizing On Fatigue Strength

Hardness of Steel (Brinell)	Treatment of Steel Surface	Pct Reduction in Endurance Limit. Un- coated Specimen = 100 pct.
90	galvanized*	5
200	galvanized*	15
250-340	galvanized*	25-40
300	aluminized	23

* Swager and France, "Effect of Zinc Coatings on the Endurance Properties of Steel," Proc. ASTM, v. 2, part 2, 1932, p. 430.

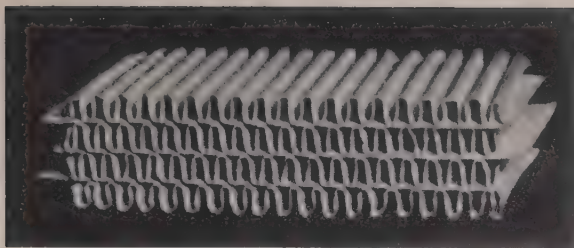


FIG. 8 - Experimental heat exchanger made for 0.006-in. corrugated aluminum sheet brazed to standard aluminum coated steel sheet.

coated with aluminum can be provided with aluminum extended surfaces, as in fig. 7, to make a very efficient heat exchanger. Various types of heaters and radiators lend themselves to this type of construction.

The technique employed in this method of manufacture is not complicated. It has been found that steel with an aluminum coating of about 0.002 in. thick can be successfully brazed

to itself or to aluminum using the standard procedures developed for brazing solid aluminum.

Fig. 8 shows a section of an experimental heat exchanger consisting of a corrugated aluminum sheet 0.003 in. thick brazed to a standard aluminum coated steel sheet. This particular assembly had successfully withstood a 200 hr corrosion test in a 7.5 pct salt spray maintained at 120°F.

Of special interest is the possibility of using aluminum coated steel strip for extended surface applications. With a relatively heavy coating of aluminum on a fairly thin steel base the thermal conductivity of such material will be considerable. Through the strength of the steel core at elevated temperatures, the biggest control factor in brazing is virtually eliminated, namely, the need for extremely accurate temperature control. With the steel core, assemblies will have many times the strength of an all aluminum design, decreasing danger of collapse during the brazing operation.

Common Sense of Spring Design

(Continued from page 85)

Distortion due to tangling occurs in some cases. In others, and this is more generally the case, a satisfactory plating job, if possible, can only be performed with special care and high costs. In extreme cases, still tank plating is made necessary, the cost of which can more than double the plain finish price of the spring.

When possible, parts which are subject to tangling should be made from pre-plated material, though such parts are unprotected at the cut-off, or from noncorrosive materials. In considering stainless, it can be said that maximum economy often can be obtained through the use of this material, especially in springs having fine wire sizes, such as 0.007 to 0.014 in., since in this size range stainless is less expensive than music wire, when the cost of plating is added to the cost of comparable music wire springs.

But even avoidance of plating will not subdue the cost factor in complicated shapes. If special packing is required, the spring manufacturer may have to make heavy charges for this service. If bulk packing is specified, the parts, because

of vibration incident to shipment, may well arrive thoroughly and completely enmeshed, calling for an expenditure for labor at the assembly line not expected by the designer.

Admittedly, the foregoing discussion is an attempt merely to hit the high spots of the subject of errors in spring design. In the effort to make the points clear, many items have been presented as errors, when, in all fairness, it must be admitted that they are errors only when they can not be avoided; when the possibility of failure of the spring, or high piece cost, becomes the lesser of two dangers.

The purpose of this discussion has been, through the presentation of the most frequently made mistakes, to offer the spring manufacturer's viewpoint and to suggest that the design of each spring should be approached as a unique problem, in connection with which load and deflection formulae, tolerance charts and stress figures present merely the basic facts, but do not encompass the entire problem any more than the markers on a golf course represent the varied phases of the game of golf.

German Aluminum Practice

WELDING of aluminum containers, aluminum alloys and the use of oxyhydrogen rather than oxyacetylene welding are described in British reports now available in this country through the Office of Technical Services, Dept. of Commerce, Washington.

Two German firms stated that they made welded containers from both 3 and 5 pct magnesium alloys on a production scale. Attempts to use a stronger 7 pct alloy were unsuccessful, but one manufacturer reported production of an alloy known as Hy75 or Hy7S which contained 5.6 pct magnesium, had a tensile strength of 20

to 24 tons per sq in., and was weldable.

Another aluminum alloy, known as "K. S. Seewasser," contained 2 pct magnesium and 1.5 pct manganese. Its uses, weldability and other properties are discussed.

Composition of aluminum welding electrodes made by one firm are reported upon. In all cases the core wire was the same composition as the material to be welded and the coating was always of the following composition, in parts by weight: lithium fluoride, 10; potassium chloride, 45; sodium chloride, 30; cryolite, 20; and sodium sulfate, 0.2.

Bonus Based on Production Value

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ADOPTION of an unusual incentive pay plan which enables its 281 hourly paid union workers to share with management the production values jointly created, was recently announced by the Orangeburg Mfg. Co. of New York City, manufacturers of fibre electrical conduit and fibre sewer pipe. The plan, known as the Rucker Share of Production Plan, will be on trial for a period of six months with the idea of writing it into the union contract if it proves satisfactory. It is novel in that it is not a profit sharing plan but one that is said to guarantee a fixed percentage of production values to the workers whether the company makes a profit or not. A large paper manufacturing concern adopted the plan last August and it is now in its tenth year in a Boston surgical instrument firm.

This plan as adopted by Orangeburg Mfg. Co. is set up to guarantee hourly workers 35.59 pct of the production values they help to create. These values, as illustrated in the accompanying table which shows figures on the first month of operation under this plan, are arrived at by deducting from sales values the cost of materials and services purchased to manufacture the product. It is described by the president of the company as opening the door for union labor to apply a method of compensation which virtually puts the worker in partnership with his employer.

"Management enters into partnership with labor to increase earnings for both," the president of Orangeburg stated. "Under this arrangement labor is not only assured of its regular contact pay but participates in the added values it helps to create." Employees will continue to receive their regular hourly rates of pay and overtime on regular pay days and every fourth week an additional check representing his share of additional production value will go to each hourly worker.

In the words of the local AFL union president, "After carefully considering this plan, members of the union voted their approval because they

First Month's Operation Under Rucker Plan at Orangeburg Mfg. Co., Inc.

(Four Week Period, April 26th to May 23rd, 1948)

1. Net Sales Value of Goods Produced	\$365,288
2. Cost of Materials and Services:	
(a) Raw Materials	\$102,523
(b) Repairs, Supplies	28,088
3. Production Values Created	234,677
4. Share of Production Fixed at 35.59 pct of Production Values	83,522
5. Regular Wages Previously Paid	72,701
6. Share of Production Credit*	\$10,821

* Share of production credit represents 14.88 pct of regular wages paid and, on average hourly rate, an additional 20¢ per hr per worker.

believe that if it works as well for us as it has for others, it will help write a new page in labor-management history, establishing a practical way to increase workers' earnings without resorting to strikes. The main objection to all other incentive plans is that they do not apply equally to all workers covered in the agreement and they usually create competitive rivalries which lead to jealousies that do more harm than good." The union president stated further that the Rucker Share of Production Plan by-passes these faults by making every worker a member of the team in a way that applies equally to all. This eliminates competition between workers and at the same time increases earnings for all.

Although this represents the first time an AFL union has adopted the plan, it was incorporated last year in a contract between the Continental Paper Co., Ridgefield Park, N. J., and a CIO affiliate of the United Paper Workers of America. Here, management claims it has provided an incentive for greater output with increased earnings for hourly workers as derived from savings in raw materials, supplies, fuel, power and repairs per ton of output; savings in labor cost, reductions in breakages, defectives and returns; increases in salable tonnage produced per year, and increases in price of tonnages sold.

Ore Sintering Accelerated by Increased Air Flow

SINTERING time for iron ore is roughly a direct function of the square root of the vacuum applied to the sintering unit according to data reported in a paper by Sven Jansson and Christer Danielsson published in "Jernkontorets Annaler." Experiments providing the data were carried out under working conditions in full scale Swedish plants of the Greenawalt type.

Where, for instance, the vacuum was doubled, the sintering rate was increased about 45 pct, and extent of the vacuum reportedly had no noticeable effect on the quality of the sinter. Production cannot be increased accordingly; however, since charging and ignition times are unaffected and vary with the size of the unit.

The series of experiments indicated that the same volume of air was required per charge regardless of the rate of flow through the material. Resistance of the charge and the pressure drop across it were found to be relatively unaffected by the variations in vacuum. This was interpreted to mean that flow conditions of the air through the charge were not essentially altered and supports the evidence that sinter quality is not endangered in stepping up the rate of flow.

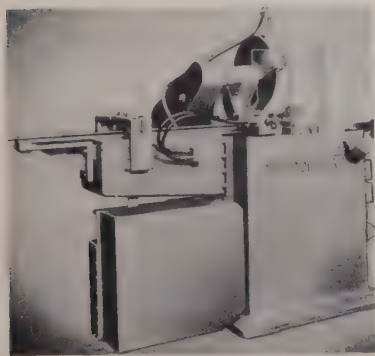
Power consumption for the units was in direct proportion to the vacuum and data on waste gas temperatures showed inappreciable variations over the range of vacuums applied.

New Production Ideas . . .

New and improved products described this week include: A dc power generator, an oven for annealing coil and sheet aluminum, a welding power unit, a gear shaver, a brush box for cleaning strip metal, a watthour meter, a flue gas analyzer, a strength-deformation recorder for core specimen tests, drag cup motors, metal cleaners, Monel sheet, and various small tools.

Abrasive Cutoff Machine

FULLY automatic operation, high production rate, and cuts held to close tolerances are claimed for an abrasive cutoff machine developed by *Bridgeport Safety Emery Wheel Co.*, Stratford, Conn. Stock up to 2 in. sq to lengths ranging from $\frac{1}{4}$ to 12 in. can be handled. The head assembly, consisting of an 18-in. abrasive cutoff wheel driven through V belts by a 10 hp motor, is mounted on a rocker shaft running in Timken bearings and is actuated by a hydraulic cylinder



which feeds the wheel in and out of the cut. The feed mechanism is synchronized with the cutting head and automatically feeds a predetermined length of stock into position in a vise. After the cut has been completed the wheel withdraws, the feeder returns to normal position, and the cycle is repeated automatically until the stock is exhausted or the machine is stopped.

DC Power Generator

A DC power source for requirements up to 5000 amp with varying voltages from 1 to 9 v, suited for chromium, bright nickel and acid copper plating, electrocleaning and electro-polishing, has

been designed by *Bart Messing Corp.*, 45 Morgan Ave., Brooklyn 6. Full load efficiency is 72 pct, increasing to 83 pct at 20 pct load.

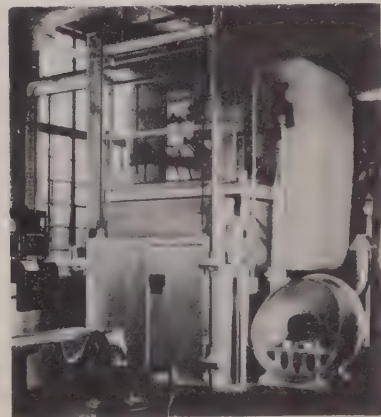


A continuous plating control permits changing tap switch positions without plating interruption. Selenium stacks are rated with 15,500 sq in. of rectifying area and heavily coated for corrosion protection. Safety elements include a positive overload protection in the dc bus circuit; a rectifier that automatically shuts off if air intake is blocked; and a cabinet that is internally lined with Tygon for corrosion protection. Dimensions are 78 in. high x 45 x 40 in.

Aluminum Annealing Oven

A N oven for annealing coil and sheet aluminum with production capacity rated at 3000 lb of metal per hr at an operating temperature of 850°F has been developed by the *Gehrich Oven Div.*, *W. S. Rockwell Co.*, Fairfield, Conn. The oven, having a work chamber 5 ft 6 in. x 19 ft 3 in. x 5 ft 11 in.,

is of insulated dual panel assembly, with interior chamber sheathing of stainless steel and exterior of black steel painted with heat resistant paint. Counterweighted, chain operated lift doors are located at both ends of the oven for charging and discharging and the oven floor has tracks to accommodate four-wheel work trucks. The heating and recirculating system is located directly over the oven. The oven is heated by an external air heater fired by a combination oil-gas burner, having an air-oil and air-gas ratio controls



to proportion the required amount of fuel with the air supplied by a turbo-blower. Full safety protection against flame failure is provided by safety shut-off valves for either fuel in event of failure of air supply to the burner, or fuel line failure.

Weldpower Unit

FOR high speed precision welding of ferrous and nonferrous metals, especially those of high thermal conductivity such as aluminum, copper and phosphor-bronze, the *Freshman 200 M.F.D. Condenser Weldpower* has been re-

designed by *Raytheon Mfg. Co.*, Waltham, Mass. The unit is electronically controlled and operates from a 115 v, 60-cycle lighting circuit. It is said to deliver a high current at low voltage to the welding electrodes and provides a precise amount of energy to the weld.



The level of energy delivered is adjustable over a range from 3.5 to 63 w sec. Weldpower units work on the stored energy principle. The welding head contains features which insure the predetermined welding pressure.

Metal Stitcher

THE S-13-C metal stitcher, manufactured by *Bostitch, Inc.*, 397 Mechanic St., Westerly, R. I., equipped with a new heavy frame and a new solenoid control, is adjustable for single or continuous operation. This machine stitches steel, aluminum, or other metals, metal to metal, or to other materials. Single 1/16-in. sheets of cold rolled steel or multiples up to 0.070-in. thickness can be stitched.

Angle Vises

TWO sizes of Yankee angle vises recently introduced by *North Bros. Mfg. Co.*, Philadelphia 33, can be used on the bench or on the machine and are available with or without swivel bases. The vises are ground on both sides, front end and bottom for use on a drill press, milling machine, and other machine tools and are said to be easily converted to low cost jigs. Jaws have hardened steel face plates and open to full capacity. A 90° scale is stamped on the vise and each is equipped with a V block for holding round stock.

Welding Compound

FOR use with Eutectic low temperature welding rods, a paste which confines the flow of molten

alloys to the area upon which the weld is to be applied, has been manufactured by *Eutectic Welding Alloys Corp.*, 40 Worth St., New York 13. This Anti-Capillary compound protects the parent metal from discoloration at welding temperatures, thus assisting in retaining the cleanliness and brightness of the metal. The compound can be used with any form of heat, oxyacetylene gas torch, soldering torch, soldering iron, furnace and high-frequency applications. It may be applied by painting or spraying and is removed by mechanical action, quenching, wire brushing or sand blasting.

Centrifugal Pumps

SINGLE and two-stage centrifugal pumps ranging from 1/4 to 75 hp and from 10 to 2500 gpm, including self-priming types, have been added to the line of liquid control equipment produced by *Bowser, Inc.*, Fort Wayne 2, Ind. Four models are available: Close-coupled with common shaft (2 ft under pump and 2 ft under motor); close-coupled with pump mounted on extended motor shaft and pump adapter (4 ft under motor); pump mounted on base plate, with or without motor and flexible coupling; and self-priming pump mounted on base plate, with or without motor and flexible coupling. Pumps are all iron, bronze fitted or all bronze with steel shafts.

Small Arc Welder

FOR small workshop or home use, a new low cost arc welder which delivers 100 amp has been

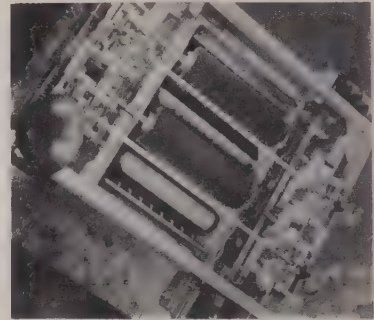


announced by *Miller Electric Mfg. Co.*, Richmond, Ind. This unit, called the Hobby Arc, available for either 110 or 220 v ac lines, operates on a standard 30 amp fuse. It is ruggedly constructed with coils wound with glass covered magnet wire, silicon steel cores, and has an aluminum case for lighter weight. The welder is shipped complete with 10 ft of welding cable with

electrode holder, 10 ft of ground cable, welding helmet, and assorted welding electrodes.

Brush Cleaning Strip Metal

CONTINUOUS cleaning of steel or nonferrous strip, after it has passed through a pickling or cleaning solution can be accom-



plished with a brush box developed by *W. S. Rockwell Co.*, 200 Eliot St., Fairfield, Conn. Made of stainless steel, this brush box will withstand the corrosive effect of the pickling or cleaning solution and oxidation from the water spray. The strip, either in single widths or in a series of strips up to 60-in. total width, enters the brush box and passes over a set of spring tension wringer rollers which press out most of the acid and water before it passes through the brushes. Other rollers remove the spray water before the strip leaves the box. From the wringer rollers the strip passes between anvil rolls and the revolving Tampico fiber or stainless steel brushes. The anvil rollers are driven in the same direction and at the same speed as the strip. The four cleaning brushes are driven, independently by ac motors, in the opposite direction to that of the strip, and at a higher speed. While being brushed, the strip is constantly sprayed with water. The setup can be arranged for dry brushing.

Watt-hour Meter

REDUCED maintenance through the elimination of jewel bearings, which are a major cause of meter maintenance, is a feature of a new watt-hour meter announced by *General Electric Co.*, Schenectady 5, N. Y. In this Type I-50 cating disk meter, the rotating element is magnetically suspended with magnetic material supporting the weight of the disk and shaft in place of jewel bearings. The magnetic suspension element consists of

two concentric magnets of cunio, a high-coercive material, placed one within the other. The outer magnet is attached to the meter frame and the inner magnet to the upper end of the disk shaft. The interaction of the two magnetic fields supports the rotating system at a small downward displacement. Stainless steel guide pins at the top and bottom keep the shaft in vertical alignment. Graphite guide bushings at both ends of the shaft run on the guide pins. Another feature is a damping system consisting of two small alnico magnets diecast into the frame, one on each side of the moving element, to minimize side thrust and tendency to noise and vibration.

Flue Gas Analyzer

A FLUE gas analyzer has been designed to analyze boiler stack gases and give a continuous indication of the completeness of combustion by indicating deviations from ideal conditions. Maximum practical combustion efficiency with this analyzer which is marketed by *Davis Emergency Equipment Co.*, 45 Halleck St., Newark 4, N. J., is obtained when the fuel-air ratio is adjusted to give the highest reading of the scale without any appreciable increase in stack temperature. A simplified flow scheme utilizes the differential pressure in

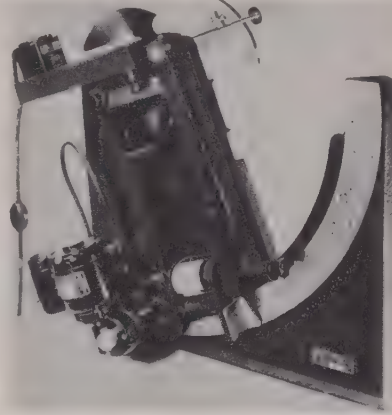


the stack to cause a continuous flow of stack gases through the analysis cell without the use of water aspirators or mechanical pumps. The analysis cell operates on a wet gas basis which eliminates the chemical drying chain. The analyzer consists of a recorder and panel 2x6½ ft and a Davis flow panel mounted near or at the point of sampling. It is operated from a 110 v, 60 cycle

power supply employing a Wheatstone bridge and a stainless steel analysis cell for measuring thermal conductivity of the gases.

Strength-Deformation Recorder

A STRENGTH-DEFORMATION recorder has been developed by *Harry W. Dietert Co.*, 9330 Roselawn Ave., Detroit 4, that may be



attached to the universal sand strength machine to test either the green compressive strength on the AFA 2x2-in. sand specimen, or the AFA core transverse strength where a 1x1x8-in. baked core specimen is used. The recorder draws the stress-strain diagram on a printed chart, ruled to show the psi compressive strength or load in pounds for the core transverse strength. The deformation is measured on the horizontal axis with a scale reading to 0.001 in. in the case of the compression test and 0.001 in. deflection in the case of the baked core transverse test. The recorder, said to be accurate to within 0.0005 in., is driven by a synchronous motor normally in an electrically-braked position. Deformation or deflection of the test specimen releases the brake causing the pen to record any change in the test specimen length, or bending in the case of the transverse test specimen.

Carbide Center Reamers

THE burnished-like finish produced when hardened materials are turned or milled with carbide tools can now be obtained in the centers of parts having hardness up to 63 Rc, with carbide micro center reamers developed by *Severance Tool Industries Inc.*, 742 Iowa St., Saginaw, Mich. Cutting teeth of the reamers are developed to avoid chatter and to correct any existing irregularities. The reamers may be used to shift centers to

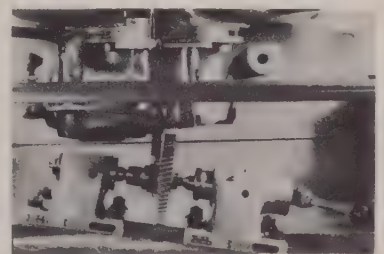
correct any misalignment and used in standard center lapping machines or drill presses. They have the standard 60° included angle and are available in ⅜ and ½ in. diam. They can be reground.

Keyway Broach Kit

A SET of standard with keyway precision broaches, slotted propeller bore tapered bushings, extension shanks, shims and a tapered base plate make up the keyway broach kit introduced by *du Mont Corp.*, Greenfield, Mass., for hand cutting standard width and depth keyways in marine propellers. The bushing is dropped into the propeller bore, the broach placed in the bushing slot and pressed through by an arbor press. The base plate is tapered to maintain an exact depth of keyway which is obtained with a second or third pass using shims supplied with the kit. Accurate keyways are cut by hand in one minute.

Involute Gear Cutter

TO overcome the difficulty of shaving shoulder gears by the rotary crossed axis principle where clearance is limited, a conical, involute cutter, available from *National Broach & Machine Co.*, 5600 St. Jean St., Detroit 13, is said to attain better cutting action with decreased machining time. Clearance is increased by tipping the work away from this cutter. This



increases the angle between the axes of the cutter and the work gear. This method of shaving is applicable to spur and helical gears or teeth that are tapered away from or toward the shoulder gear, such as clutch gears in automotive transmissions.

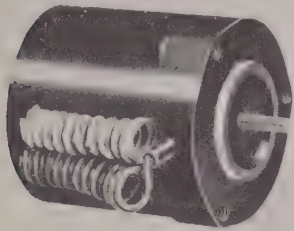
Drill Drifts

DRILL drifts have been redesigned by *Cleveland Twist Drill Co.*, 1240 E. 49th St., Cleveland 14, by adding a shoulder, or flange, on the head end. The new

drift is said to be less damaging to babbit hammers and a more direct, solid driving force can be applied to the enlarged end. This enlarged end prevents the drift from flying through the spindle slot.

Drag Cup Motors

TWO types of miniature drag cup motors are recommended for standard application as follow-up motors and for application where motors are not generally



used, such as use as dynamometers for low value torque measurement. They are also recommended by *Kollsman Instrument Div., Square D Co., 80-08 45th Ave., Elmhurst, N. Y.*, for use in control mechanisms to obtain variable speed and torque through voltage control. Through constant torque applied with these motors, back-lash in a train of gears is claimed to be reduced. Motors are said to reverse in as little as 0.1 sec, feature maximum torque at stall, and continuous operation under stall conditions without overheating. One type runs at 3000 rpm on 115 v, 60 cycle current and the other at 5000 rpm on 115 v, 400 cycle current. Maximum stall torque of 0.32 to 0.41 oz-in. are produced. Motors weigh 7.6 oz and are 1.922 in. long x 1.719 in. diam.

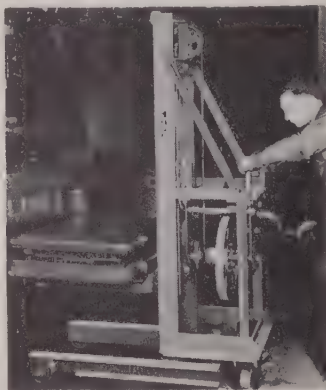
Metal Cleaners

EFFECTIVE singly or in combination for cleaning a wide variety of metals and alloys, two new metal cleaners have been announced by *Calgon, Inc., Hagan Bldg., Pittsburgh*. Metal cleaner No. 21 is a dry granular alkaline detergent for spray-cleaning in metal-washing machines. It has proved effective when used in combination with the new Calgon emulsion cleaner, for immersion cleaning in dip tanks and for heavy duty spray cleaning. The cleaner contains Calgon, a water softener.

Temperature for its use is 140° to 180°F. The emulsion cleaner is a white, creamy emulsion of an organic solvent in a relatively small amount of water. It readily disperses when added to the cleaning bath. Combination of the two cleaners is said to provide the advantages of an alkaline cleaner with those of an organic solvent. The emulsion cleaner is easily rinsed from the metal surface with hot or cold water, leaving no solvent or other film. Temperature range recommended is 140° to 160°F.

Portable Elevators

HOIST units on two new heavy duty models of the Economy Shoplifter elevator are of the crank up and down type and include such

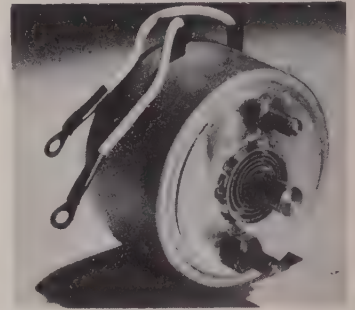


features as an automatic holding brake which does not require manual setting or releasing, a safety ratchet and pawl that automatically holds the load, and a crank handle pressure of approximately 20 lb to elevate or lower a load. These models, manufactured by *Economy Engineering Co., 2653 W. Van Buren St., Chicago*, are Type DX heavy duty Shoplifters, made in 1000 lb and 2000 lb. capacities. Overall frame work dimensions are identical for both capacities but the heavier machine has reinforcing members to accommodate the heavier loads. Each capacity has its own hoisting unit. Overall height and width permit operation through doorways 6 ft 8 in. high x 25 in. wide or larger. Platform is 24 in. wide. Two 5-in. diam basewheels are located under the platform and two 6-in. swivel casters are located at the opposite end. A foot operated floor lock is optional.

Rotary Solenoids

THE Ledex No. 7 and No. 8 solenoids available from *G. H. Le-land, Inc., 149 Webster St., Dayton*

2, produce torques of 25 and 50 lb-in., respectively. The No. 7 is 2¾ in. diam, weighs less than 2½ lb and produces a starting torque of 25 lb-in. with a 45° rotary stroke. The No. 8 solenoid has a diameter of 3⅜ in., weighs about 4 lb, and develops a starting torque of 50 lb-in. with a rotary stroke of 45°. Extras such as a dust-proof cover and self-contained scroll-type return spring are optional to make the solenoids adaptable to a variety of



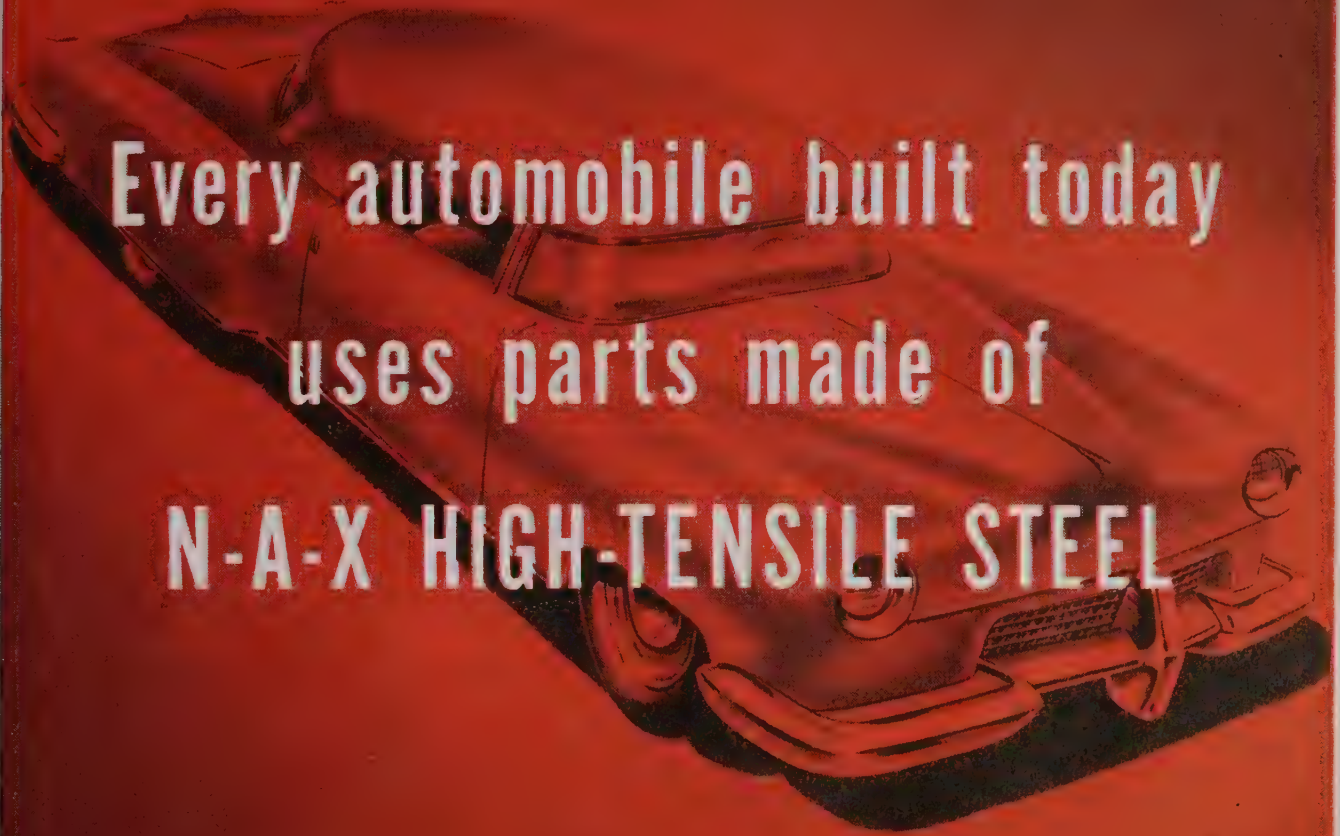
applications. A choice of wire sizes from No. 13 to No. 35 represents dc operation from 6 to 550 v. Rectifiers are available for solenoid operation on ac current.

Monel Sheet

A MONEL sheet developed for roofing purposes by *International Nickel Co., 67 Wall St., New York 5*, is rustproof and designed to cut fabricating and installation time. This new sheet has mechanical and corrosion resistant properties and lends itself to various bending, forming, seaming and soldering operations. Available in standard roofing thicknesses, it can be adapted to nearly all types of roof construction. The sheet is tough and hard and has a low coefficient of expansion, high rigidity, is not subject to fatigue cracking, and remains unaffected by sudden temperature changes.

Spray Booth Kit

HAZARDS around spray booths where inflammable paints and varnishes are used can be reduced with the spray booth kit announced by *Ampco Metal, Inc., Milwaukee 4*. The kit consists of an assortment of non-sparking tools suitable for cleaning or making repairs around the booth. Among the tools found in the kit are a claw hammer, long blade scraper, deck scraper, spray booth scraper, screw driver and chisel, all made of Ampco metal or Ampco beryllium-copper.



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• Auto wages and car prices go up a third time . . . Trend toward decentralization of auto plants gains momentum . . . Dearborn Motors is aiming at 100,000 tractors this year . . . K-F sets a new production record.



DETROIT—Ford's offer of an increase of 11¢ to 14¢ per hr to be added to the straight time rate of its employees—if accepted—will just about button up the third round of wage boosts so far as car producers are concerned. With Chrysler, Packard, Kaiser-Frazer, Hudson, Willys-overland and Nash giving 13¢ raises and GM settling for 11¢ plus a tie-in with the cost of living, the car makers were settling down this week for what they hoped would be a long run of production uninterrupted by work stoppages in their own plants and, they hoped, a coal strike in July.

Yet to be reckoned with is the possibility of strikes in the plants of major parts makers. Among the supplier group, Briggs Mfg. Co. has granted a wage boost of 15½¢ which includes the elimination of paid holidays (IRON AGE, July 24, p. 76). Motor Products Corp., Kelsey-Hayes Wheel Corp. and Budd Co. have agreed to a 13¢ increase and White Motor Co. and Firestone Tire & Rubber Co. have signed new contracts calling for an 11¢ raise for hourly workers.

At the moment the only labor dispute of consequence in the Detroit area involves the Automotive Tool & Die Mfg. Assn. where the union is demanding a 15¢ increase. The best offer by the tool shops to date calls for an 11¢ raise now plus a 3¢ advance Jan. 1 1949 if agreement is reached on a 24 month contract. Work on both GM and Chrysler new models has been halted by this impasse, it is reported.

Up to the present time GM stands alone among auto producers in offering a guaranteed cost-of-living wage rate to its workers. Reports indicate the GM settlement has been well received by GM workers who certainly were in no mood to make further sacrifices in earnings in order to establish a new wage pattern for the rest of the industry.

Meanwhile some criticism of the GM settlement has been heard from outside sources, principally from those who attempted to hold the wage line such as the steel and the electrical industries.

If the GM thesis is tenable—that further attempts to hold the wage line could only have resulted in long and costly strikes in the auto industry this summer and that a guaranteed standard of living for the workers offers some basis for permanent labor peace in the automobile industry—GM's decision can be strongly defended. It has also been argued here that more than 1000 U. S. industrial firms had already raised wages prior to the GM settlement. Hence, it is contended that GM did not start the third round of wage boosts even though the GM decision may have been a finalizing factor in the long list of pay increases.

* * *

THE trend toward decentralization of automobile production is now well established. As pointed out in the current issue of Automobile Facts published by the Automobile Mfg. Assn. since the end of the war a total of 34 major manufacturing and assembly plants have

been built. This brings the total number of U. S. assembly plants to 113. The plants are located in 77 cities of 24 states.

As might be expected Michigan leads with 27 new plants of which 15 are in the Detroit area. Since the war 17 auto plants have been built in California. Other states benefitting from the industry's postwar expansion program include Ohio with 11 new plants, Pennsylvania 7; New York 6; Wisconsin 6; Indiana, New Jersey and Missouri 5 each.

Many factors have to be taken into consideration in locating the new plants. One economy sought is reduced freight charges. A car maker has reported, for example, that freight costs have risen 57 pct since June 1946, adding \$20 to yearly operating costs. By locating branch assembly plants near major markets, this producer hopes to make a substantial saving in distribution costs.

Another factor is the improved layouts of the new plants, insuring a better flow of materials. Obviously the new and more efficient machinery and equipment in these plants are also expected to result in substantial cost-savings.

At the present time, skilled labor shortages exist, particularly in the Detroit area. It is also argued that concentration of operations in very large plants presents traffic and parking problems that have affected operating costs. One firm finds that factory efficiency suffers when more than 25,000 persons are employed in one plant.

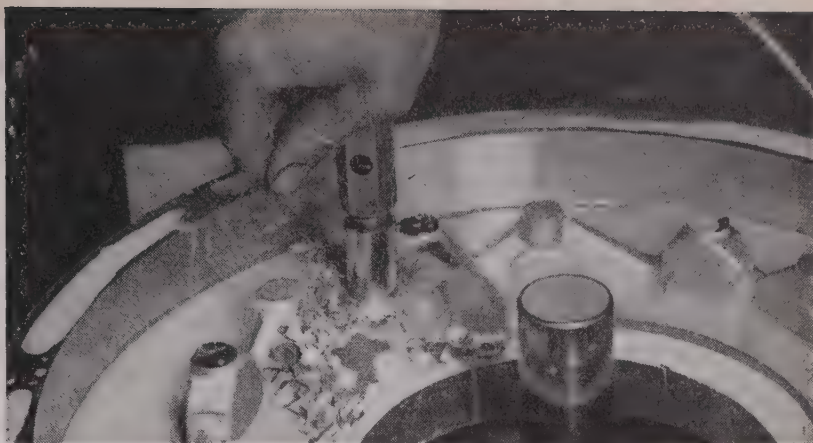
Automobile Facts also points out that special attention is being given to material handling costs which some industry officials say account for one third of all wages paid in their plants.

Another consideration is the fact that older plants frequently lack enough aisle width, overhead clearances and structural strength for the latest and most efficient equipment.

Additional savings are being sought, it is reported, in better

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packaging, purchasing studies and the establishment of new work standards for maintenance, inspection and "nonproductive" jobs.

In bringing out its postwar model, one auto firm called in its purchasing staff to review all the details of the new model. By changing the design of some parts and making substitutions for several materials, this firm saved an estimated \$1.5 million without lowering in any way the quality of the product.

RECENT increases in new car prices by Ford, Chrysler, Packard, Nash and GM Truck indicate that thus far the savings effected have not kept pace with rising labor and material costs. Ask any auto executive when the new economies will make themselves felt so far as car prices are concerned and he will agree that up to now cost reductions have not been very important. However, the industry continues to hope that with the return of some kind of stability in U. S. prices the multi-million dollar modernization programs inaugurated by the industry can be translated into benefits that will be passed on to the consumer.

* * *

Some car producers have compiled statistics to demonstrate that despite all the advances in car prices to date, it takes fewer pork chops, less suits of clothes and a lot less lumber to buy an automobile today than it would have taken to buy a prewar car. This is, of course, just another way of saying that most commodity prices have risen faster than car prices. Carrying this comparison over to steel, it can be argued just as logically that a steelmaker has to sell quite a few more tons of steel today to buy a car than he did before the war.

* * *

DEARBORN MOTORS, national marketing organization for the Ford Tractor and Dearborn farm equipment, was host this week to more than 500 members of the press and radio and representatives of farm organizations in an impressive demonstration of 64 farming tools designed to operate with the Ford tractor.

Among the implements demonstrated were eight types of plows,

ten varieties of seed bed preparation tools, seven kinds of cultivating implements, harvesting equipment and special tools designed for soil conservation.

Since the Ford tractor was introduced in July a year ago, 45 new implements have been added to the Dearborn line. At the present time, it was disclosed, Dearborn Motors is marketing 9000 Ford tractors and 40,000 Dearborn implements per month. During 1948 the company expects to sell more than 100,000 tractors and 500,000 farm implements.

Many of the tools such as dozers, cultivators, scrapers, scoops and loaders operate with the hydraulic lift of the Ford tractor. Special implements including off-set disc harrows, disc ridgers and levelers are designed to meet soil requirements of various sections of the country.

Additional implements included in the demonstration were a corn picker and two types of combines built by Wood Bros., Inc., Des Moines, a Dearborn subsidiary.

Of particular interest to the group was a plow equipped with right and left units. This equipment permits back and forth cultivation instead of the usual method of plowing around the perimeter of the field. Most ingenious device displayed was a hydraulic jack made of light steel tubing that literally permits the tractor to be raised by its own boot straps. This makes possible rapid changing of tires or replacing the tractor wheels.

* * *

PUBLIC showings of the new Ford have already attracted more than 10 million people. In addition to the half million Ford employees and their families who turned out for Ford family parties in 30 cities across the nation, 2.5 million saw the new cars at co-operative dealer displays in New York, Detroit, Washington, Philadelphia, Chicago, St. Louis, Los Angeles and Kansas City. This is in addition to the hundreds of thousands who have examined the new models at 65,000 dealers' showrooms across the country.

Detroit dealers alone spent an estimated \$100,000 in a show at Convention Hall that was televised locally and broadcast on a national

network. In Chicago a million persons saw the 4-day showing arranged by metropolitan Ford dealers adjacent to Soldiers' Field.

In addition to the Waldorf showing in New York the cars were on display at Macy's department store, Gimbels, the Astor Hotel lobby, New York Athletic Club and Pennsylvania Station.

Dearborn sales executives apparently overlooked few bets in placing their new cars before the public. In Detroit, top Ford executives were seen mingling with the crowds, asking questions, testing public reaction. It is a safe guess that the Ford sampling of public opinion of its new products is the largest—and the fastest—in the history of the industry.

The prediction made in New York by Henry Ford II that Ford orders would shoot up 100,000 in the next 30 days now seems ultra conservative. With practically all auto producers having longer lines of waiting customers now than they had when production was resumed following the war, most sources here believe the pressure on car makers to deliver new cars is going to bound up sharply in the next few months. Your chances of getting delivery of the new car you ordered months ago seem to be getting no better fast—despite rising car prices!

* * *

KAISER-Fraser turned out its 250,000th automobile last week, thereby establishing a production record that is likely to stand even during a period in which raw materials and parts are in good supply. The quarter millionth K-F car was driven from the assembly line at Willow Run on June 26.

During the month of June, 1946, K-F made seven automobiles. By the end of the year total output was 11,753 units. During 1947 production jumped to 144,506. During the first 6 months of this year K-F will turn out approximately 95,000 cars. Using a single shift 9 hr day, 6 day week, K-F expects to produce 21,000 units this month which will surpass the January record of 20,667 units when production was on a two-shift basis. K-F also reports that retail sales are continuing at a record high.



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*Designers and Makers
of Deep Drawn
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• State laws stymie efficient use of trucks for hauling steel . . . Federal legislation not a likely remedy . . . Experts say attitude of states shows improvement.



WASHINGTON—The rapidly increasing use of trucks and heavy trailer combinations as a means of transporting steel products, particularly on short hauls, is beginning to add to the clamor for revision of the numerous conflicting and restrictive state laws pertaining to truck size and weight limits.

While trucking interests are pushing for federal legislation to fix limits on the size and weight of vehicles operating in interstate commerce, so as to remove existing obstructions, burdens or discriminations, Congress has perennially shied away from infringing on the rights of states to regulate such matters. Transportation interests, therefore, believe that the state legislatures are still the places where industry should make its views known.

Higher railroad freight rates and changes in the methods of selling steel brought about by government pressure have been the primary reasons for the trend toward trucks in the transportation of steel products. In addition, transportation interests foresee an acceleration of this trend as a matter of plain economics.

For example, Harrison Rogers, President of the Truck-Trailer Manufacturers Assn., points out that "if a manufacturer who requires a carload of steel a day finds that it takes 14 days from the time the car is loaded at the steel mill until the steel reaches the plant, he requires 14 carloads of steel in addition to his normal inventory just to provide for the amount in transit. If delivery time could be cut from 14 days to 1 day through the use of highway transportation instead of rail, 14 carloads of steel have been added to the available supply just in this one instance alone."

ASSUMING that the trend toward the use of trucks as a means of transporting steel products continues, it appears evident that industry generally, in addition to vehicle makers and the motor freight haulers, has a real interest in restrictive state size and weight limitations.

While this space does not permit an analysis of the variations among the laws of the states in detail, some of the effects can be seen by taking Pennsylvania as an example, particularly the steel producing and consuming industry centered around Pittsburgh.

In this area, truck transportation becomes a part of steel operations through the adjoining states of Ohio, West Virginia, Maryland, New York and New Jersey. In addition, transportation from Pennsylvania is also necessary through Indiana, Delaware, Connecticut, and Michigan.

Despite the need for the most efficient highway transportation possible among these states, in recent months Pennsylvania was treated to the spectacle of a truckers sit-down strike on the famed Pennsylvania turnpike. The drivers complained that Pennsylvania's vehicle size-weight law is so restrictive that it prevents them from earning a decent living. These men were mostly owner-drivers, compensated on a ton-mileage basis.

PENNSYLVANIA, however, is but the center of the regional example cited. It allows on the conventional three-axle tractor and semitrailer a gross vehicle weight, for tractor, trailer and load, of 45,000 lb, with a maximum of 20,000 lb per axle. The length limit is 45 ft. In adjacent Ohio, a weight formula applied to the 45 ft tractor and semitrailer would allow a gross weight figure of about 66,000 lb provided the combination has five axles. Whereas, Pennsylvania allows 20,000 lb per axle and gives no credit for tandem axle construction, Ohio allows only 18,000 lb per axle but gives credit for the added axles.

Indiana is a case in point as to what these and other such restrictions force into being. For Indiana, if it follows the letter of its one law, can allow no more than 50,400 lb gross vehicle weight and, therefore, in order to bring this weight limit into line with present-day realities the state grants "tolerances" as part of a reasonable policy of law enforcement. Thus, Indiana, in practice ignores its formula for weight computation and allows up to 53,900 instead of 50,400 lb. Its 18,000 lb axle weight is enforced with a "tolerance" of 1000 lb, permitting 19,000 lb per axle. Height by law is 12 ft, for a vehicle, but 13 ft is permitted because that is the "tolerance" granted as administrative policy. The law says length must be 40 ft, or less, the police say 45 ft will not cause arrests.

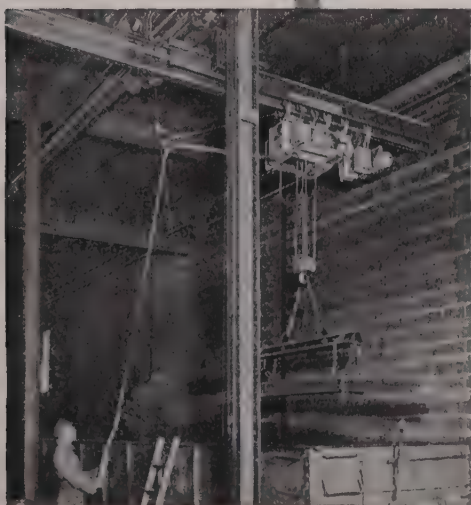
In the steel producing and consuming area centered around Pittsburgh, axle-load limits in the various states range anywhere from 18,000 to 22,400 lb per axle, lengths range from 40 to as much as 55 ft, gross vehicle weights for large tractor-trailer units, such those that handle steel products, from 44,000 to as much as 66,750 lb, depending on formula computations, interpretations and enforcement policies.

HIGHWAY interests contend that there is no sound reason for this hodge-podge. For example,



**5-Ton
Low Headroom**

**MONORAIL
CRANES**

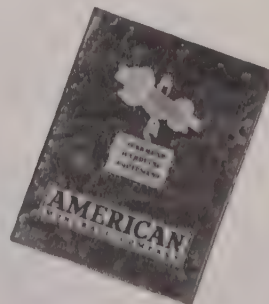


American MONORAIL 5-Ton Cranes furnish efficient operation where headroom is a critical problem. Twin-bridges with carrier mounted between bridges bring load clearance to uppermost limit for extreme low headroom operation. American MonoRail Low Headroom Cranes operate by cab or from floor by finger-tip control. Interlocking devices permit carrier to travel beyond craneways. Loads are moved over maximum area, every square foot of operating and storage space is served. Cranes can be installed under present operating conditions without excessive structural changes.

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MONORAIL

COMPANY

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CLEVELAND 7, OHIO

THE IRON AGE, July 1, 1948—105

John S. Worley of the University of Michigan, a nationally recognized transportation expert, recently told a House Investigating Committee that all highway engineers were in substantial agreement that 18,000 lb axle loads, properly spaced, would do no damage to pavements regardless of how many axle loads were applied consecutively.

Continuing, he pointed out that "weak bridges have been used for years is a reason why we cannot have heavier loads on our highways. I have given this matter a great deal of consideration and am willing to be responsible for the statement that, with a few exceptions, the bridges on our highways are quite capable of carrying much heavier loads than are permitted on them at the present time."

Mr. Worley, however, does not agree with trucking interests on the advisability of enacting federal legislation setting size and weight limits for motor vehicles. He elaborated this by saying that he felt sure that Congress had the constitutional authority to set aside state limits which interfere with interstate commerce but he believed that discussions and hearings would continue and accelerate the

improvement which has been evident among the states for the last 10 years.

In any case, vehicle manufacturers, motor freight haulers, and highway user organizations maintain that if the steel and other heavy industries are to achieve the maximum efficient use of truck transportation state size and weight limitations must be revised.

* * *

THE U. S. Bureau of the Census—the nation's official gatherer of facts and figures—is getting ready to take the first censuses of business and industry since 1939.

The Census Bureau, realizing that many businessmen chart their courses well into the future after studying the official government reports, has been increasingly self-conscious about its out-of-date figures since the end of the war.

Tremendous changes have been made in the production and distribution systems of many industries since 1945. Populations have shifted from certain areas of the country to others. Business as a whole has expanded—both in existing and in brand new fields.

Business organizations all over the country—from the U. S. Cham-

ber of Commerce to the smallest trade associations—have been after Congress to do something about this lag in commercial statistics. This year the lawmakers did something—at the urging of Rep. Harold C. Hagen, R., of Minnesota. And President Truman lost no time in signing Mr. Hagen's bill into law.

Mr. Hagen says the new law will satisfy an urgent need for up-to-date information concerning distribution, mineral industries, service trades, and other businesses.

He further points out that the types of businesses affected include growers, packers, refiners, manufacturers, distributors (including wholesalers, brokers, jobbers, retailers and service establishments), firms dealing with marketing problems (such as market research agencies, advertising agencies, advertising agencies, newspapers, magazines, trade journals, and broadcasting stations), transportation agencies, government agencies, trade associations, chambers of commerce, universities, schools, libraries, and other groups.

THE new law provides for the first such census (except that of manufactures) to be made in 1949 and in all subsequent years ending in 4 or 9. Since provision for a census of manufactures is made in a current appropriation bill, the first census of this type will not be made until 1954.

In the field of transportation, the statute provides for the collection and publication of statistics from air, rail and truck operators, but duplication of information collected by such agencies as the Interstate Commerce Commission is prohibited. Particular emphasis is placed on collection of trucking data, since the rapid growth of this form of transportation has left existing statistics sadly out of date.

Trucking, stated Representative Rees, R., of Kansas, is of "growing importance, not only in the location of industries, and the transportation of goods, but also in developing and planning the highway transportation system of the country." He added that trucking "has significant application with respect to problems which would arise in attempting to meet a future national emergency."

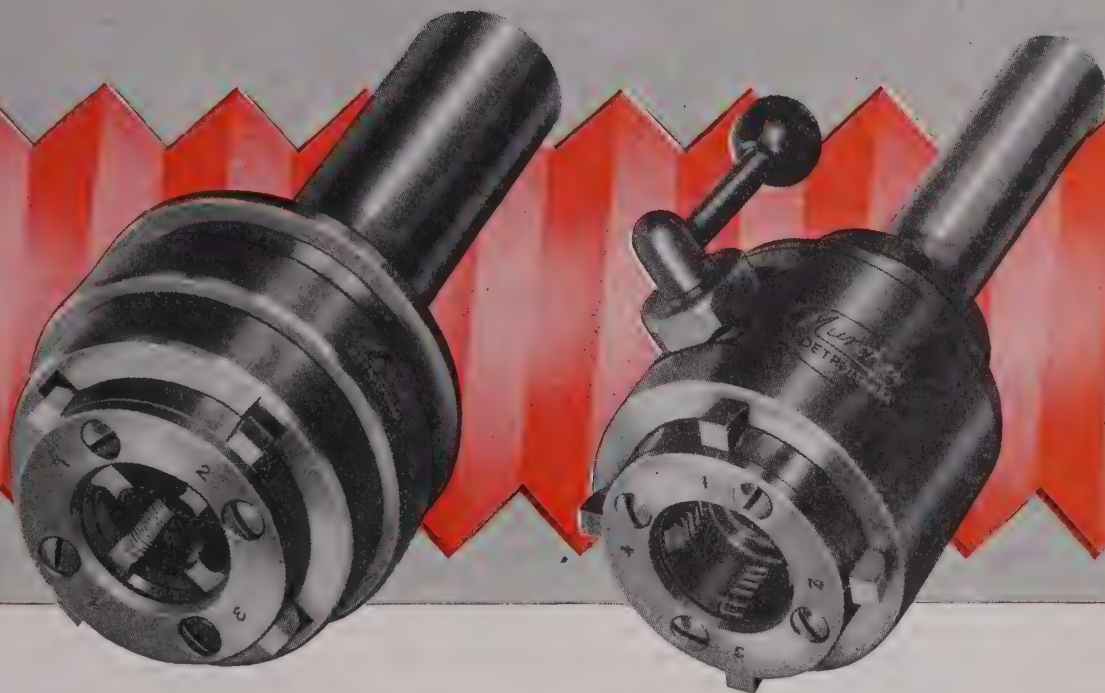
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BY J. R. WILLIAMS



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SUBSIDIARY OF THE SHEFFIELD CORP.
DAYTON 1, OHIO, U. S. A.

• West Coast airframe builders get lion's share of 70 group air force plane orders . . . Court decision in Boeing strike may be far reaching.



LOS ANGELES—West Coast aircraft plants received 71 pct of the orders placed for planes of the 70 group air force. The seven major companies are to build 1573 of the 2201 planes ordered, which includes nearly two-thirds of all jet fighters, all the heavy bombers, and more than three quarters of all other types, such as transports and trainers. Four companies in the Los Angeles area alone will make 64 pct of all planes ordered thus far in the new program, Capt. Leland Webb, USN (Ret), vice-president, Aircraft Industries Assn., told THE IRON AGE.

"It will take about 18 months to build up to the manufacturing rates called for under the new orders. Production has sunk to low levels during the past 2 years, when airplane purchases by the armed services fell below even the pre-war year of 1939," Capt. Webb pointed out. "I do not predict any immediate large increases in aircraft employment until after the new program really begins to roll around the first of 1949. In fact, it is even possible that there may be some layoffs until the new program gets under way," he said.

Employment in the seven West Coast companies is now 84,000. By July, 1949, an employment is anticipated of a little over 100,000. There will not be much of an increase over 100,000 when the pro-

gram reaches its peak in about 2 years, since four companies have gone into commercial airline work, and generally, as this work declines, personnel will be shifted into the new military work. Thus, the overall increase in employment will not be as large as expected. Also, many projects will convert work from job shop to assembly type of operation where more pounds of air-frames are produced per worker.

No new plant construction is expected, for the industry as a whole has more than adequate factory space to handle the new program. Factory area of 22,292,000 sq ft is now in operation in the seven major companies on the West Coast. This is more than half of the entire country's floor area. With utilization of all facilities, on the basis of a three shift operation, the West Coast plants are capable of handling about three times the size of the national program now contemplated.

Here's how the new business lines up: Bombers—Boeing B-50B, 132, and B-50C, 30; North American B-45C four-engine jet, 51; Northrop B-49, eight-engine jet, 30. Fighters—Lockheed F-80C, 457; North American F86A, 333 and F-86C 118. Transports, trainers—Douglas C-124A, 28; North American T-48, 266; Lockheed TF-80, 128.

FOUNDRY operations of Columbia Steel Co. at the Torrance plant near Los Angeles are to be discontinued according to J. L. Perry, president of this western subsidiary of U. S. Steel Corp. All present commitments for production will be completed within 60 or 90 days before suspension of foundry operations and all other steel-producing units will continue in operation. It is expected that the 150 foundry workers at Torrance will be absorbed by other operations.

"It is well known that Columbia Steel Co. has turned most of its attention to production of rolled steel products," Mr. Perry said. "After giving the foundry situa-

tion long and careful study, it was deemed wise to abandon foundry operations at Torrance to make available all steel possible for conversion into rolled products."

The Torrance plant and its foundry were originally built by the Llewellyn Iron Works in 1917. The facilities were acquired in 1923 by Columbia Steel Corp., which 7 years later joined the subsidiaries of U. S. Steel and assumed the present name, Columbia Steel Co. There are 1500 employed at present at the Torrance plant.

SEATTLE—Decision of Federal Judge John C. Bowen in Federal Court to the effect that the strike of the aeronautical mechanics union at the Boeing Airplane Co. was an "illegal" strike may have an important bearing on labor management negotiations in other cases.

After a 2-day hearing the judge refused to issue an injunction forcing Boeing to bargain collectively with the striking union which is a local of the International Assn. of Machinists. Company officials hailed this decision as a major victory as throughout the current dispute they have maintained that the strike was illegal as the union had not given a 60-day notice of intention to strike as called for under the Taft-Hartley Act.

Judge Bowen stated: "It would not be just or right for this court to compel the company to bargain with representatives of employees who have lost their status under law." He added that failure of the union to comply with section 8-d of the Taft-Hartley Act had taken away the union's bargaining right under the labor law.

Court action came about as a result of the efforts made by Boeing officials to have the general counsel of the National Labor Relations Board request a temporary injunction forcing the company to bargain with the union. This action by the company was taken when the NLRB filed unfair labor practices against the company as a result of the union charging Boeing with failure to negotiate. Boeing

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Over-metal and pig molds made of "National" electric furnace graphite produce cleaner ingots faster and more economically. Graphite is immune to thermal shock, insoluble, not wet by molten metal, easy to machine, has high thermal conductivity, and lasts indefinitely. This means ingots chill rapidly, won't stick in the mold, are free from contamination and smooth in finish. No mold wash necessary. Quick chill cuts floor space and number of molds to the minimum.

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"National" graphite fluxing tubes, for purification of hot metals, give unusually long life and will not contaminate the metal. They are heavy-walled, easily threaded, will not fuse or dissolve, and are not attacked by Nitrogen, Chlorine, or the rare gases. Stocked in 2" OD by 1/2" ID by 2', 3', 4 1/2', 6', and 9' lengths. "National" graphite thermocouple sheaths are similar in construction to the fluxing tubes, except that they are blind end. Both products possess all the advantages of pure electric furnace graphite.

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"National" graphite skimmer floats prevent oxidation, hold back slag and dross, and will not contaminate the casting metal. They are fitted with a convenient lifting hole for easy handling and may be used over and over again. Made of pure electric furnace graphite—no foreign bond—these floats will not spall or crack. Stocked in diameters from 3" to 9" for use with crucibles #5 to #100 inclusive. "National" skimmer floats pay for themselves!

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looked forward to a speed up in the legal machinery by getting the case into court since the ULRB apparently is inclined to act more quickly on cases which have previously been filed for court action.

Boeing Co. and the local 751 is scheduled to plead their case before a trial examiner from Washington on July 7 and after the public hearing this examiner is expected to make his decision and pass it on to Washington's main board for decision.

Walter Moldawer, who pleaded the NLRB case in Federal Court here said that the same evidence would be used before the board hearing as was used in the court case. There is a possibility, he stated, that the NLRB would drop its complaint after the court decision.

Meanwhile Boeing's employment department was hiring new employees and strikers at the rate of approximately 200 per day. Production is under way on a small scale in all departments and shops throughout the plant, where approximately 3000 factory workers are on the job as compared with 14,800 when the strike was called.

Between 1500 and 2000 members of the striking union are finding employment in the strawberry fields of western Washington according to John Summers, in charge of work releases for the union. According to Mr. Summers thousands of other members of the union have also found temporary employment.

Boeing is continuing to subcontract as much work throughout the West Coast as possible to keep production up at the Seattle plant in the face of the strike. One of the latest contracts has gone to Iron Fireman Mfg. Co. of Portland which has been awarded a substantial contract for the production of precision machine parts for the B-50 bomber.

SAN FRANCISCO—Progress in manufacturing and industry in the San Francisco Bay area will be on display from July 2 to July 9 in the Civic Auditorium where 250 manufacturers and distributors will exhibit their wares under the auspices of the Bay Area Industrial Exposition.

Among the exhibitors will be northern California tool and machinery manufacturers who are planning presentations of their

products in use, and several metal producing and fabricating companies.

This full dress parade of industry in the 12 counties surrounding San Francisco Bay has been developing for the past year. In discussing the industrial growth of this area which warrants the present exposition, P. A. Hoyt, vice-president Oakland, Calif., Chamber of Commerce and executive vice-president of Oliver United Filters Inc., said: "More than 130 industrial plants—200 national concerns—are located in the Oakland area alone. In 1947, 59 new industrial plants located here with investment of \$15 million. Plus this, plant expansions added \$25 million more."

SALT LAKE CITY—The secession movement from the International Union of Mine, Mill & Smelter Workers over the communist domination issues has gained a momentum in the Utah-Nevada district which suggests that the best the International can hope for is to hang on to the copper mining industry.

Fifteen locals have now withdrawn from IUMM&SW. Three

important Nevada locals, however, have voted to stick with Mine-Mill and all three are in the copper industry. Of the seceded locals, seven of the smaller ones have affiliated with the Progressive Metalworkers council which was set up by the International Union of Marine & Shipbuilding Workers as a haven for Mine-Mill secessionists. The other eight are maintaining an independent status for the time being. One barrier to affiliation of some of these locals with UMC is the fact that some of their leaders were, up to a week or two ago, denouncing PMC as a "union busting" plot.

The secessionists have breeched Mine-Mill's hold on the Utah copper industry by winning a local of copper smelter workers and a local of clerical and technical workers in the copper milling field.

Utah operators are standing firm on their decision not to negotiate with Mine-Mill as long as the leaders refuse to sign non-Communist affidavits. On the other hand American Smelting & Refining and Kennecott have opened wage negotiations with seceded locals whose officers have signed the affidavits.

Kaiser Co.'s Expansion To Provide Three Main Items on West Coast

Oakland, Calif.

• • • **Henry J. Kaiser** announced recently that the \$18,500,000 expansion of the Fontana steel plant, just authorized by the Reconstruction Finance Corp., will provide three main items of steel desperately needed by western industries and the public.

The Kaiser Co., Inc. expansions are:

(1) Rolling facilities to produce hot steel sheets up to 78 in. wide and to a minimum of 14 gage thickness. The new mill is scheduled to produce 100,000 tons a year of both coils and flat sheets.

Manufacturers will use the West's new source of hot sheets for heavy sheet metalwork, barrels, oil and domestic water tanks, pipe, railroad car building, auto frames, further processing by cold-rolling and an array of light fabrication.

(2) A new electric weld pipe plant will have 100,000 tons a year capacity for the production of pipes from 5 to 14 in. in diameter.

This will help alleviate a desperate pipe shortage being experienced by petroleum companies and public utilities, since the new plant will supply what is called "Oil country goods"—the pipe used extensively in oil fields, as well as for gas and water lines.

(3) The construction of a \$3.5 million additional openhearth furnace, included in the total \$18.5 million expansion, was previously approved by RFC and construction already is under way.

This furnace will add a capacity of approximately 144,000 tons a year to Fontana—an increase of about 17 pct to the southern California plant's steelmaking output. The goal is to complete the furnace his year.

Orders for equipment are being placed and work will be started immediately at Fontana, Kaiser Co., announced.

For threaded  or  recessed parts that have been hard to clean:

CARBURIZE IN HOUGHTON'S NEW PERLITON "W"

**Rapid penetration . . . Bath balanced by normal drag-out
. . . Parts easily cleaned in hot water**

Here's a liquid carburizing process that maintains full carburizing value at temperatures up to 1575° F., thus affording speedy penetration. A special starting salt—Perlton 323—is used to melt down the bath and prepare it for work, then Perlton "W" is added as replenishment is required.

Think what this development can save you in cleaning time on threaded or recessed parts! It likely took hours to sand-blast and clean such parts in the past. Now you can immerse and agitate them in hot water, re-

moving the salt in a jiffy. Normal production drag-out will result in sufficient replenishment to keep the bath in constant balance. And parts are shinier and cleaner than before heat treatment.

We suggest you write for the Perlton "W" data sheet, and discuss this latest development with the Houghton Man who calls on you. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa., and Chicago, Detroit or San Francisco.

Photomicrographs of nital-etched specimens of SAE 1020 steel at 1575° F., carburized for (1) 30 minutes; (2) one hour,



and (3) two hours. Note the even case gradation and good carburized structure. Mag. X-75.

PERSONALS

• • •



A. A. TOGESEN, sales manager, Bulldog Electric Products Co.

• **A. A. Togesen**, assistant sales manager, has been appointed sales manager of Bulldog Electric Products Co., Detroit. Mr. Togesen joined the company in 1937 as special field engineer.

• **C. A. Hubley** has been appointed representative for the Detroit Die Set Corp., Detroit, in the western Michigan territory. Mr. Hubley was formerly connected with C. M. Sutton Sales Co.

• **Danforth K. Heiple**, a field engineer for R. G. LeTourneau, Inc., Peoria, Ill., has been promoted to chief field engineer for the company succeeding **R. C. Lewis**, who has resigned. Mr. Heiple joined LeTourneau in 1945.

• **James L. Erickson** has been appointed regional sales representative in southern Ohio and Indiana for Production Die Cast Co., with his headquarters in Dayton.

• **R. E. Peterson** has been named supervisor of X-ray diffraction laboratory of the aluminum rolling mills, Permanente Metals Corp., Trentwood, Wash. Mr. Peterson comes to the Trentwood mills from the Fansteel Metallurgical Corp.

• **Thomas R. Turner** has been appointed new divisional sales representative covering Virginia, Maryland, Delaware, southern New Jer-

sey and eastern Pennsylvania for Watson-Stillman Co., Roselle, N. J.

• **C. R. Brown** has been appointed purchasing agent for the E. W. Bliss Co., Cleveland, succeeding **Edward E. Ebel** who has been named production manager. Mr. Brown was formerly purchasing agent at the Brooklyn plant and previous to that was connected with the Toledo plant.

• **Ralph H. Maxson**, president of the St. Paul Foundry & Mfg. Co. of St. Paul, has been elected chairman of the board of directors of the W. L. Maxson Corp., New York. Mr. Maxson has been a member of the board since the incorporation of the company in 1935.

• **Frank R. Kohnstamm** has been elected vice-president of Jack & Heintz Precision Industries, Inc., Cleveland. He joined the company in 1947 as general sales manager.

• **L. D. Litsey** has been appointed Chicago area representative for worm gear speed reducers for the De Laval Steam Turbine Co., Trenton, N. J.

• **John W. LeDuc** has been appointed vice-president of the Castaloy Corp., Detroit. He formerly operated his own consulting and production engineering firm identified as John W. LeDuc & Associates.

• **Richard O. Horning** has been elected assistant treasurer, Mesta Machine Co., Pittsburgh. Mr. Horning served in various departments of Mesta and previous to his present appointment he was a sales engineer.

• **John T. Llewellyn II** has been named president of Chicago Malleable Castings Co., Chicago. **Leon J. Wise** has been elected vice-president and director, and **Leonard F. Hartwig**, a director.

• **C. A. Streb** has been appointed president, Union Metal Mfg. Co., Canton, Ohio, succeeding **C. A. Orr** who was president and general manager and has been re-elected chairman of the board, which office was broadened in executive and supervisory powers. Mr. Streb joined the company in 1926 and served as secretary for 11 years. **E. W. Riemenschneider**, chief engineer, has been made vice-president in charge of engineering. **A. R. Jones**, assistant secretary, has been ap-

pointed secretary, and **D. B. Hanna**, assistant general manager, has been made general manager.

• **Charles E. Cleminshaw** has been appointed chief industrial engineer for Parker Appliance Co., Cleveland. Mr. Cleminshaw comes to Parker from the National City Bank of Cleveland. He was formerly connected with the Republic Steel Corp. **John W. Overbeke** has been named staff engineer for special projects of Parker Appliance. Prior to joining the company, he served several firms as consulting engineer and was formerly chief engineer of Simonds Aerocessories, Inc.

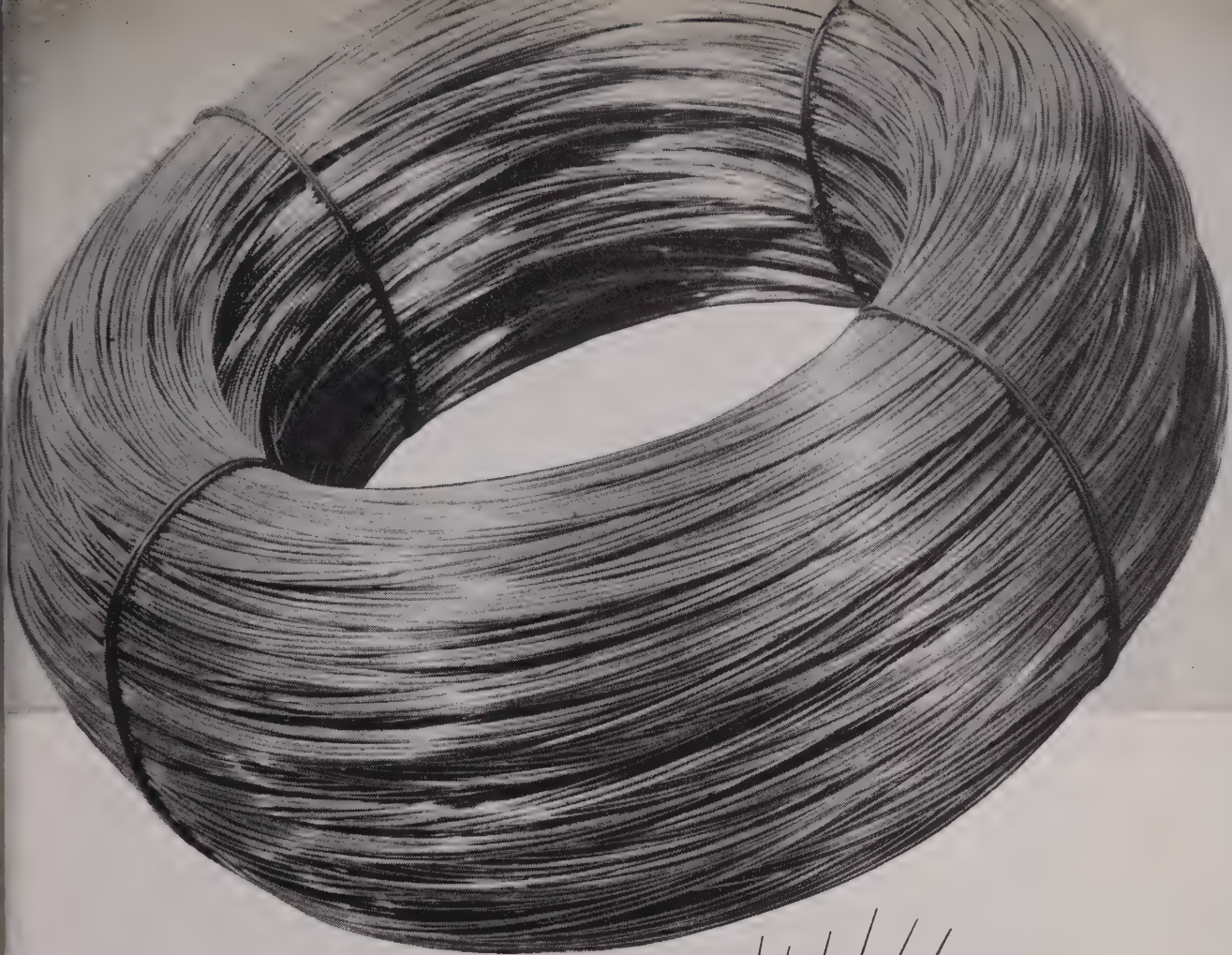
• **Charles Cromwell** has been named division sales manager of Threadwell Tap & Die Co., Greenfield, Mass., for the north central territory including Illinois, Wisconsin, Minnesota, Missouri and Iowa. Mr. Cromwell has been associated with the Threadwell organization since it was acquired by the Sheffield Corp. and prior to that spent many years in Detroit.

• **Gilfry Ward** has been appointed vice-president of the Kellogg Div., American Brake Shoe Co. Mr. Ward has been with Brake Shoe since 1928. He will continue to serve as vice-president of the American Manganese Steel Div., and will be located at Oakland, Calif.

(CONTINUED ON PAGE 144)

GILFRY WARD, vice-president Kellogg Div., American Brake Shoe Co.





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formability with a desirable degree of stiffness. The steel for this fine bright wire is produced in CONTINENTAL'S own open hearth furnaces. KOKOTE is furnished in coils, on spools, or on paper cores. Write to CONTINENTAL at Kokomo, Indiana, describing your wire requirements.



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• Trade unions almost entirely absorbed in getting more money for less work . . . Neither management nor labor has right to dogmatize upon problem of industrial democracy.



LONDON—The domestic propaganda of the Labor Party on the one hand, and the resolutions of the trade union conferences on the other, show that one of the most haunting skeletons in the cupboard at Transport House is again rattling its bones. Nearly 3 years of Socialist government have passed, and yet organized labor feels deeply conscious that the worker has too little to say in the direction of industry, and that even in nationalized industries the old boss has merely been exchanged for a new one. The rattle is unmistakable; it is loudest in coal mining but was plainly audible in the resolution which was proposed by the Amalgamated Engineering Union at Scarborough, supported by several other unions, for a larger proportion of workers' representation in the nationalized industries. This resolution was opposed from the platform, but the Conference referred it to the Executive for discussion with the Trades Union Congress, and there are signs that the section of the party that believes in direct workers' control, that is, in the main, the unions, will not allow the matter to drop. Moreover, when and if the economic tide turns, and the nationalized Boards are compelled to play such dirty employers' tricks as dismiss-

ing labor and asking for lower wages, the skeleton will step right out of the cupboard.

There is nothing very surprising about the persistence of the demand for workers' control of industry. Whatever its present ideological basis may be, the springs which fed the British labor movement were the orthodoxies of Marx and Engels, among them "ownership by the workers of the means of production, distribution and exchange." That is a golden ideal which became implanted in the minds of working class Socialists while this century was still young, and it has done as much as anything to keep the movement alive throughout its lean times.

BUT because workers' control would, as the leaders of the Labor Party have long recognized, result in massive impoverishment and economic chaos does not mean that the human aspirations from which the demand for it arises can be ignored. They were touched on by Mr. Herbert Morrison in his speech at Cardiff recently. "One of the worst crimes which the Victorian capitalists committed," he said, "was to devise a system which robbed large numbers of workers of

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the satisfaction and human respect which should always go with doing a job well. They pretended that fear of starvation or a craving for more money were the only forces that make people work . . . While not rejecting individual material incentives, we assert the need for the great incentive of public service."

Here is the sound and positive argument for industrial democracy; that it can restore some of the destruction wrought by the machine age on human personality. Ideally, it should turn the mere "hand" back into a man or woman and harness to the cause of general betterment those qualities which, denied by the nineteenth century industrial system, found their expression in the great trade union movements. The British working man, convinced by the industrial

history of the early nineteenth century of the helplessness of the individual employee, sank his individuality in the stern collective discipline of the union. But some of the early idealism of the union movement has vanished, and instead of being a breeding ground for new ideas on the technical and human progress of industry, the unions have become almost entirely absorbed in the question of getting more money for less work. To the extent that this is so, they have become a purely negative element in the industrial structure of the country, demanding much and contributing little.

NEITHER management nor labor has any right to dogmatize upon the problem of industrial democracy since neither has yet found a solution to it. Joint consultation between management and labor at the workshop level breaks down unless there is an unusually high caliber of men on both sides. Capital sharing and profit sharing have only a limited application to a working population that is prepared to enjoy the fruits but not to bear the risks of capitalism. Many useful experiments have been made, but no one can pretend that the problem is solved, or that principles of general validity have been worked out.

The British Labor Party, having for so long sown the seeds of workers' control, cannot now complain if they reap the harvest of industrial sluggishness and a growing disillusionment with the effects of nationalization upon the lot of the worker. The tragedy is that the leadership of the Labor Party, having progressed from syndicalism and guild socialism to a more workable policy, has not educated its rank and file to accept the realities of industrial organization. Mr. Morrison must devote much of his time to breaking down an attitude which his party, deliberately or by implication, has done everything to foster. The British Labor Party inculcated the unnatural attitude of the British worker towards his work; the British Labor Party will have to solve the problem it has created.

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Industrial News Summary...

- **Steel Wages to Go Up Soon**
- **Price Increases to Follow**
- **F.O.B. Mill System Looming**

PHILIP MURRAY'S steelworkers are going to get a raise in pay within a few weeks. When the exact figure is determined the wage hike will probably be accompanied by a social security package ordered under the contract signed in 1947. Negotiations between United States Steel Corp. and the steelworkers on the group insurance and other features have been under way for more than a week.

The capitulation on the steel wage issue will come after steel leaders have admitted that their attempt to stem inflation by cutting prices and refusing wage increases has failed. It was a good gesture. It means that the steel industry for once will not have to take the blame for a new inflation spiral.

Just as steel wages will go up, so will steel prices. After steel companies find out what their new coal costs are, and how much steel wages will add to steel-making costs, up will go steel prices.

First the cuts made a month or so ago will be eliminated. Steel people say their costs for materials have steadily increased and are still on the way up. This will be taken care of. Next factor will be the coal wage and pension increases, which will be reflected in higher coal costs for steelmakers. Then the steel wage costs along with the cost of social security plans will be included. All of these factors will be figured in the new prices for steel to come soon after the steel wage announcement.

STEEL leaders privately feel that they can not stand by and see their profits eaten up by high prices and high wages. They feel that they did their part and tried to stem the tide. Now, in fairness to their stockholders and in order to secure their investment and provide for new equipment and proper replacement, prices are going up—come hell or high water. No one except the politicians will argue with them when their price increases are compared with other price trends.

There is probably no steel man in the country who is not worried sick over the final outcome of the present spiral in wages and prices. Yet steel prices will go up—maybe as much as 4 to 7 dollars a ton over quotations presently in effect with major steel firms.

The big blockbuster which is expected to hit steel customers soon will be an f.o.b. mill system in steel sales. Then the customer will pay the freight. This is what the Supreme Court in effect calls for, say steelmakers. And that is what steel companies must do if they are to obey the law of the land as they think the Supreme Court has interpreted it.

An industrywide survey among steel users by THE IRON AGE shows that 70.1 pct do not favor the elimination of the basing point system. Arguments from

F.T.C. men are that the commission does not want a complete elimination of present selling practices. But sometime after July 9, when the cement industry goes to an f.o.b. mill system the steel industry is expected to follow.

THIS may mean plenty of headaches for steel customers. About 8 pct of them told THE IRON AGE that the elimination of the present way of selling steel would mean they would have to move their plant. Moreover, 68.4 pct said the basing point was not discriminatory. And 63.5 pct did not favor an f.o.b. mill system of selling.

This may be water over the dam. Or the steel user may have to use his persuasion on Congress to make the multiple basing point system legal. Why? Because steel firms are convinced that the Cement Case applies to every company which sells on a multiple basing point or a zoning system.

Many steel users claim that in the present sellers' market they are paying a lot more freight than in normal times. To the extent that this is true an f.o.b. mill setup now would not bear too hard on them. But this may be wishful thinking. Such a system means that most mills will no longer absorb much, if any, freight—as long as there is enough demand in their own backyard. This demand is present now—but not in normal times.

An f.o.b. mill system will mean one of the biggest changes in steel marketing practices since Pittsburgh Plus went out in 1924—but steel people say the result will be much more far reaching.

The settlement of the main issues of the coal controversy means that the steel industry this year may surpass, by a few million tons, the peacetime record of 85 million tons made last year. There is little standing in the way of the steel industry turning out close to 85 or 87 million tons.

Had it not been for the 1.6 million ton loss because of the coal strike earlier this year, the mark might have come close to 90 million tons. The ingot rate this week is estimated at 96.0 pct of capacity. As soon as the coal vacation is over, and the Fourth of July holiday influence is spent, the rate will bounce back to a higher rate.

An f.o.b. mill system of steel pricing will renew interest in the building of steel plants on the East Coast. United States Steel Corp. has had plans for such a plant for sometime. The project now has gone much further than the planning stage. The main obstacle has been the substantial increase in costs over what had been originally estimated. Other steel companies have been flirting around with the possibility of an eastern plant and some have had plans drawn up for at least 2 years.

• **JUMPING THE GUN**—Sheffield Steel Co.'s price increases and f.o.b. mill quotations may be setting a precedent that other steel producers will soon follow. Bar strip, sheets and strip plus plates and structurals are now quoted f.o.b. mill for their Kansas City mill only. Merchant bars were increased 25¢ per 100 lb at Kansas City which makes the mill price \$3.90 per 100 lb. This product went up 30¢ per 100 lb at Houston. The new Houston price is \$4.00 per 100 lb. Structural prices remain the same at Kansas City, but went up 5¢ per 100 lb at Houston making the new price \$4.00 per 100 lb in that area. Sheets and plates were increased \$1.00 per 100 lb at Kansas City only making the price now \$5.80 per 100 lb. The old price of \$4.20 per 100 lb at Houston remains the same on sheets and plates. Strip was lowered, 10¢ per 100 lb at Kansas City to \$3.90 per 100 lb. No change was made in the Houston strip price.

• **SPEAK UP**—Industry will have an opportunity this summer to tell Congress how it feels about the outlawing of the basing point system by the Supreme Court. Senator Capehart, R., Ind., chairman of the Senate subcommittee investigating the possible effects of the court's decision in the Cement Institute case, has stated that his group "will hold hearings during the recess of Congress to receive information and suggestions" relative to the decision. Any person or organization wishing to testify or offer information on this subject to the subcommittee may do so by notifying the Capehart subcommittee.

• **ALUMINUM PRICES**—Aluminum Co. of America on June 25 advanced 10,000-lb 99+ pct aluminum to 16¢ a lb and pig to 15¢ a lb. The cent a pound increase followed signing of a new contract with the USWA granting wage increases of 10¢ to 16¢ per hr. AFL workers at Alcoa received the same increase.

• **STEEL SUBSIDIES OFF**—Silent partner in the relatively low prevailing prices for British steel has been the little discussed hidden subsidies. Previously indicated in THE IRON AGE, the British government has taken the first of a series of steps to reduce this burden of subsidy payments. One of the subsidies was freight cost on imported ores. Industry, which has been paying the prewar price plus 50 pct, will now pay 100 pct over. This move will raise basic pig iron 80¢, hematite iron \$1.20 and semi-finished steel \$1.00 per ton. Finished steel prices remain at previous levels. ■

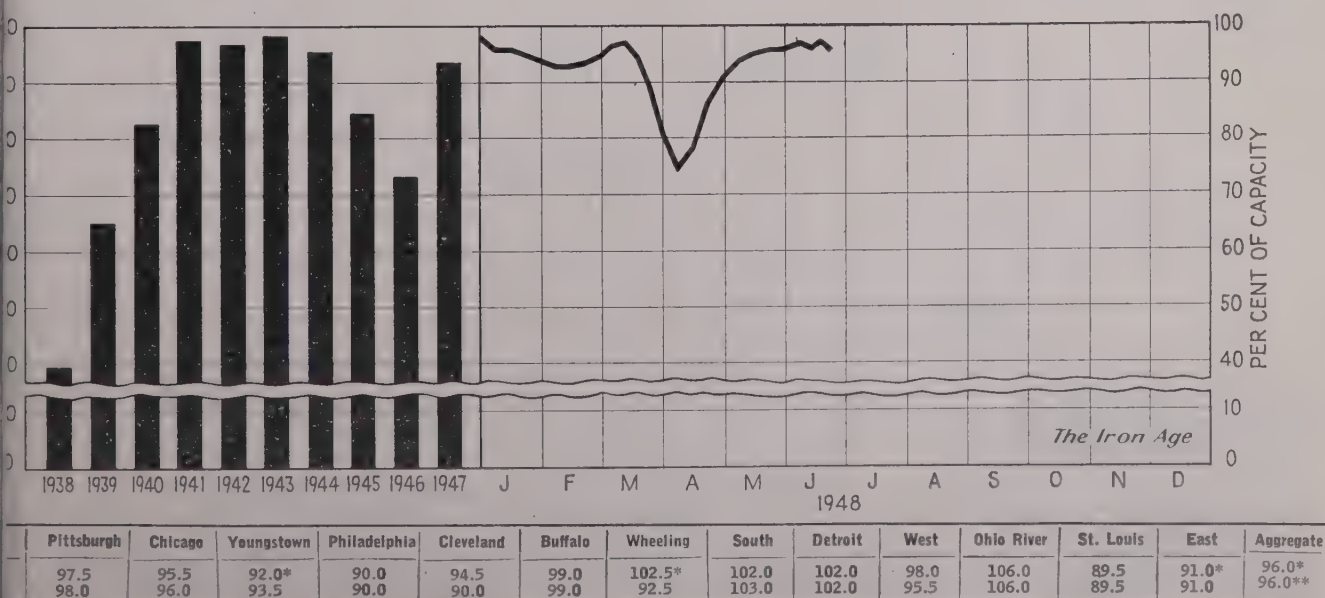
• **CRITICS NOTE**—One of the biggest hurdles to sustain high operating rates is the shortage of lake bottoms to transport ore. Inland Steel last week contracted to provide steel for a 20,000 gross ton ore boat that requires 6800 net tons of structurals and plates. Inland must deliver this tonnage to the American Shipbuilding Co. in Cleveland by January. They are not sure they can find that much steel to ship by that time. This is a case in point to those who are shouting for more basic steel capacity. At present commitments to consumers are so great that steel companies are having trouble scraping up steel for anything special. Where would they find the large tonnages of steel to immediately enlarge their basic iron and steel making capacity? Everyone knows—it would come from customers' allocated tonnages.

• **DECISION STANDS**—The Supreme Court has refused a Justice Dept. request to reconsider a June 7 decision upholding the sale of the Consolidated Steel Corp. to the Columbia Steel Co., a subsidiary of the U. S. Steel Corp. The Government sought to halt the sale on the ground that it would result in a violation of the Sherman Anti-Trust Act. In asking reconsideration, Solicitor General Philip B. Perlman said, the court erred in finding there was no "specific intent" to accomplish an unreasonable restraint of trade and in finding that there would be no such restraint in actual operation of plants affected by the purchase.

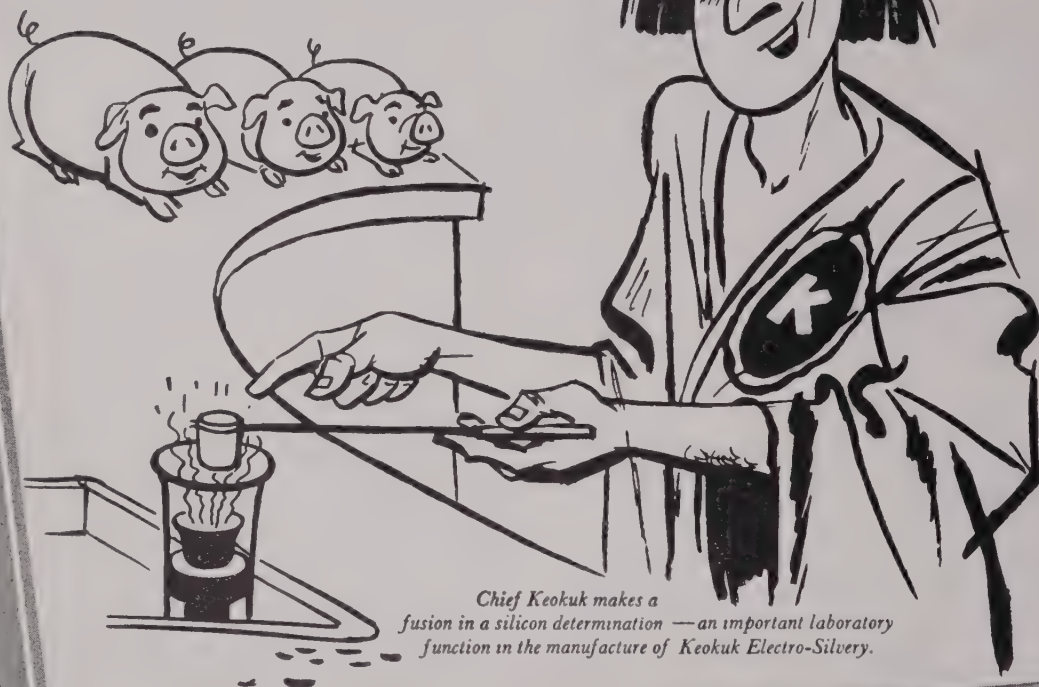
• **WAGE RAISE**—Wage increases ranging from 9 to 16¢ per hr for 70,000 Westinghouse Electric Corp. production and salaried employees have been announced jointly by W. O. Lippman, vice-president of Westinghouse and James J. Matles, Director of the UE Westinghouse Conference Board. Increases are retroactive to June 11. The contract will continue until 1950, but may be opened once during 1949 by the union for negotiation of wages and salaries.

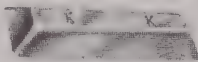
• **BURNED UP**—Damage estimated at \$150,000 resulted from a fire that destroyed a motor house and a conveyor at the coke plant of the American Steel & Wire Co., Joliet, Ill., last week. Estimated loss in coke production of 30,250 net tons comes at a bad time since the South Works plant of the Carnegie Illinois Steel Corp. recently lighted their new 1507 net-tons-per-day blast furnace. All blast furnaces at South Works and Gary are running and every possible ton of Carnegie coke is needed there.

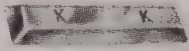
Steel Ingot Production by Districts and Per Cent of Capacity



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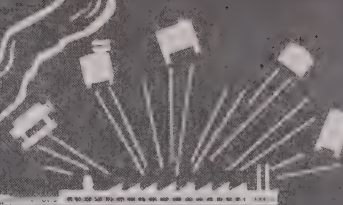
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Steel Basing Points and The Consumer



Majority of Steel Users Favor Retention of Basing Point System

New York

• • • The Federal Trade Commission does not like the basing point system in steel. They have been saying so for years. The steel industry does not like the FTC's ideas on the basing point. And they have been saying so for years.

Neither FTC nor the steel industry has made any real effort to find out what the steel consumer thought. THE IRON AGE has tried to do this. The questions asked were simple. Most steel buyers do not need a course in basing point methods. In practice they know more about it than either the FTC or the Supreme Court.

The majority of steel customers are against the elimination of the basing point method in steel selling. They said this in answering an IRON AGE postcard poll. And it made no difference whether they were in the steel company's backyard or a couple of thousand miles away. Even steel users within 50 miles of their major source voted 60.9 pct against the elimination of the basing point system. And the ones whom the FTC say an f.o.b. mill system will help—those more than 500 miles from their steel sources—voted 80.0 pct against the elimination of the basing point system.

THE IRON AGE poll returns were 26 pct of the total letters sent out. According to research questionnaire people, this is no mean result. The 3350 letters were sent to a wide cross-section of steel consumers both from geographical and use standpoints. Close to 50 letters were received which elaborated on the postcard return. Excerpts from

Reject F.O.B. Mill Setup; Many Comments Show Strong Feelings

◦ ◦ ◦

By TOM CAMPBELL

News-Market Editor

◦ ◦ ◦

these letters are printed elsewhere in this article.

Steel users were asked to give the miles distant from their major steel source. The returns were broken down into eight mileage classifications.

No fault should be found with the effort of the steel companies to defend a system of selling which they feel provides competition and fairness to customers. Nor should fault be found with the FTC in having an opposite view to this—if you are on neither side. But from the volumes written, both pro and con the basing point, it is

doubtful if any real answer will be found until and unless the Supreme Court acts specifically on steel. The tendency to take the Cement Case conclusions as the last word for steel may be stretching it a little.

Were it not for the Cement Case, Lynn Paulson, Steel Case counselor for FTC, could in his words "settle this whole thing in a few minutes." But steel people who would be amenable to taking his way of settling this perplexing problem are scared stiff of the Cement ruling. No amount of talk can change their mind—so the fight will go on.

But what about the consumer? Is he to have no say in the matter? Apparently not because neither the FTC nor the steel companies show any desire to bring the consumer into the matter. However, several large steel users are turning their research sales departments upside down trying to estimate what effect an f.o.b. mill system will have on their purchases. It is not an easy matter to find out.

But it is no hard matter to get the pulse of what steel buyers think. At least 8 pct feel that if the steel industry is driven to an f.o.b. mill price basis they will have to move their plant. That may not sound like a big figure, yet on a sample basis it is quite serious, if those answering know what they are talking about—and they think they do.

Although many steel customers are paying the freight to get steel and absorption of freight by steel companies is not what it will be when slim times come, 68.4 pct of steel users questioned did not think that the basing point system was

DON'T BE SURPRISED!

New York

• • • The steel customer may not like the f.o.b. mill system that FTC wants. And the steel companies may not like it. But steel firms will obey the law as they think the Supreme Court has interpreted it in the Cement Case. It is more than likely that the steel industry will be on an f.o.b. mill basis of selling long before the FTC cease and desist order is issued next year. It is also likely that steel customers after they see such a system will try to get legislation to make the multiple basing point system in steel legal.

Basing Point Comments From Consumers

... Personally I think the elimination of the steel basing point is asinine and the last word in stupidity.

... Our feeling is that definitely the multiple basing point should be retained. While it is true that our principal sources of supply are located at Chicago and Gary, approximately 135 rail miles away, others of our suppliers are located at Middletown, Youngstown, Butler, Cleveland and other Eastern points. We realize only too well that our present production cannot be maintained on the basis of steel we can procure from Middle-west mills. We further realize that if the multiple basing point is abolished, our Eastern mills will refuse to sell in this territory. Consequently, our present production could not be maintained and present facilities would depreciate in value in direct proportion to the production which we might anticipate based on our ability to secure steel. This certainly is a vital factor to not only our company but all Middle-west manufacturers, a great many of whom are in a like position.

... In theory, the steel basing point system should be eliminated, or greatly modified, but I doubt that such action is practical without a great deal of legislation and regulation of the entire competitive system.

... The basing point system is discriminatory in that it favors certain districts, particularly the basing point cities as against others, but it is hard for me to conceive of a system that will permit mills to be strictly competitive, and yet be much if any improvement over the present.

... We do not believe the basing point is the crux of the situation; rather we think that sharply rising costs of labor and essential materials at the mill, and very sharply rising freight charges, are the real causes of our difficulty. These factors make deliveries to distant points impractical under today's conditions and we cannot see how the elimination of basing points would eliminate this tendency in a more normal, or, in a buyers' market.

... The fear of drastic action by the Federal Trade Commission, plus the excessive demands for steel products, has caused several mills to withdraw from the southwest market. Regardless of what the Federal Trade Commission thinks it is doing, if a base price is established at each mill throughout the nation, it immediately eliminates a substantial part of competition for each mill, making it possible for them to set up a much higher price and eliminate competition.

... Many people look upon steel as a very standardized item. We have found frequently that our cost

of production can vary as much as 10 pct and sometimes even 20 pct because of a variation in the quality of sheet steel used. This is true in times like these and it is also true in times when steel is not scarce because some steel companies seem to have the ability of interpreting the user's requirements to a greater degree than others.

... Suppose steel was sold f. o. b. mill and the steel buyer had to buy from mills located in different areas. If all mill prices were the same, the delivered price from each mill would vary by the difference in freight and in our case this difference can be as high as \$6.00 per ton. The result is that the buyer has two or more differing prices on the same section and specification of bar or billet. He will probably average the price for purpose of cost but how about the quotation on the parts to be made from the steel? The quotation is generally made well in advance of buying the steel, and at a time when the buyer does not know where the steel will originate or what his delivered cost will be. If he is operating on a low profit margin, he may lose the job if he uses the low steel price, gets the job and then has to buy the high priced steel, he may lose money.

... As you know, we cannot all live in a steel mill's back yard. The fairest way to keep the competitive situation is to have the basing point system.

Small companies cannot have plants in various localities dependent on steel supply as large companies do. They must depend on being able to buy as cheaply as the large plants or they go out of business. The basing point system takes care of this.

... As we mentioned above Chicago is our nearest basing point, and yet three quarters of our sheet steel requirements come from points farther distant. This is from necessity, the Chicago mills not having given us any tonnage of volume. ... We, of course, can only speak for our own company, but we would go on record as saying that the steel industry has been much more helpful than any reformers with whom we have come in contact.

... We are inclined to favor a modification of rather than elimination of the basing point system for pricing steel. We believe a delivered price within a given zone, depending on distance from producing mill, would be more satisfactory from a consumer's standpoint and would cause less confusion and hardship on both buyer and seller than a complete elimination of the present basing point system. ...

discriminatory. This may have been a confusing question. The "yes" answers might have referred to the present practice of making the consumer pay the freight in many cases—a practice which may change when demand falls off.

Whether the steel industry knows it or not, Mr. Paulson who handles the case for the FTC never had any intention of "ruining" the industry or throwing it into "chaos." That's what he says. And he makes it stronger by his statements to THE IRON AGE in this issue, p. 123.

But it is not Mr. Paulson whom some steel officials and their legal minds shy away from. It is certain members of the FTC who for years have made it plain that if they had their way the steel industry would go to an f.o.b. basis. Freight absorption would be too hard to do under their rules, and finally an attempt would be made to slam any steel maker who charged anything but a uniform net price. If such members today deny that is their intention, there has been a major change in their thinking—but no one in the steel industry feels there has been a change—Mr. Paulson notwithstanding.

The steel consumer tells THE IRON AGE to the tune of 63.5 pct that he does not want an f.o.b. mill system. This high percentage cannot be laughed off. The steel buyer today knows what he means when he talks of an f.o.b. mill system. He ought to. He is practically in that now with the heavy withdrawals that have been made in the last few years by steel companies pulling out of some areas.

Even the steel users close to the mill do not want an f.o.b. mill system. About 52 pct of those within 50 miles of their steel sources do not want a f.o.b. mill system. And those far removed from the mills—73.7 pct—do not want it. It is amazing that in all answers to questions asked of steel users in this survey the majority in every geographical group were against the aims of the FTC. The steel consumer knows what he wants. And if the going gets tough the steel consumer can make himself heard in Congress—which is probably what he will do if the answers to this survey are a criterion of what consumers as a whole think.

A breakdown of the questions and answers as to distance from major steel sources follows:

(1) Do you favor the elimination of the steel basing point system?

Miles From Steel Source	No. of Answers	Percent of Total	
		Yes	No
50 or less	179	39.1	60.9
51 to 100	113	31.9	68.1
101 to 200	188	29.8	70.2
201 to 300	143	28.7	71.3
301 to 400	76	28.9	71.1
401 to 500	54	20.4	79.6
over 500	100	20.0	80.0
no mileage	23	25.0	75.0
Total	881	29.9	70.1

THE QUESTIONS

• • • The questions on the basing point survey shown on the right were sent to 3350 metalworking companies rated at \$125,000 and over. These firms represent an excellent cross section of the industry both geographically and by types of products manufactured. All classes of manufactured and fabricated steel products were represented in the mailing. Returns were received from 881 firms representing 26.3 pct of the total letters sent out. The survey was closed quickly and the answers have all been received within the past 3 weeks—The Editor.

(2) Would its elimination force you to change your plant location?

Miles From Steel Source	No. of Answers	Percent of Total	
		Yes	No
50 or less	176	3.4	96.6
51 to 100	114	3.5	96.5
101 to 200	186	6.5	93.5
201 to 300	131	6.9	93.1
301 to 400	72	9.7	90.3
401 to 500	49	22.4	77.6
over 500	91	17.6	82.4
no mileage	27	11.1	88.9
Total	846	8.0	92.0

(3) Do you feel the basing point system is discriminatory?

Miles From Steel Source	No. of Answers	Percent of Total	
		Yes	No
50 or less	175	36.6	63.4
51 to 100	111	23.4	76.6
101 to 200	183	33.9	66.1
201 to 300	139	30.9	69.1
301 to 400	76	32.9	67.1
401 to 500	53	28.3	71.7
over 500	100	33.0	67.0
no mileage	28	17.9	82.1
Total	865	31.6	68.4

(4) Do you favor an f.o.b. mill price with you paying the freight?

Miles From Steel Source	No. of Answers	Percent of Total	
		Yes	No
50 or less	175	43.0	57.0
51 to 100	113	36.3	63.7
101 to 200	185	36.2	63.8
201 to 300	144	34.7	65.3
301 to 400	77	35.1	64.9
401 to 500	54	29.6	70.4
over 500	99	26.3	73.7
no mileage	23	28.6	71.4
Total	875	36.5	63.5

Q. Do you favor the elimination of the steel basing point system?



YES
29.9%



NO
70.1%

Q. Would its elimination force you to change your plant location?



YES
8.0%



NO
92.0%

Q. Do you feel the basing point system is discriminatory?



YES
31.6%



NO
68.4%

Q. Do you favor an f.o.b. mill price with you paying the freight?



YES
36.5%



NO
63.5%

OIC Allocates Steel For Prefabricated Houses; SPAC Approval Needed

Washington

• • • At a meeting with the Office of Industry Cooperation last week the Steel Products Advisory Committee reversed its earlier decision on steel allocations for all-steel prefabricated houses and agreed to provide 58,000 tons of steel (primarily sheet) for this industry during the remainder of this year and the first 2 months of 1949. The committee also approved an additional allocation of 21,000 tons of sheet for flue-connected furnaces, bringing to a total of 233,000 tons the allocation for the warm air heating industry. Both decisions are still subject to approval by the Steel Producers Advisory Committee.

The industry members made it clear, however, that the allocation for all-steel prefabs was agreed to only because of pressure brought by Congress and several government agencies. The industry objected to the allocation because of the experimental nature of this industry. The 58,000-ton allotment will provide only 7,590 houses. Should there be a market for these houses the allocation will have to be increased substantially, resulting in diversion of large quantities of high-grade sheet.

The industry also expressed the opinion that steel was not the controlling factor in the housing shortage, but that if it were this tonnage could provide more conventional houses which require an average of 1½ tons of steel each, as compared with the 9 to 10 tons of steel needed for each metal pre-fab.

Dept. of Commerce officials told the committee that the provisions in the new draft law requiring mandatory procurement of steel for military needs is not likely to have any direct effect on the voluntary agreements program. It is hoped, however, that military steel needs will be channeled through OIC, so as to minimize the confusion that would attend direct military intervention in the government steel procurement picture. Maximum direct military needs for steel are estimated at not more than 2 million tons.

At the same meeting, OIC officials ruled out a voluntary program for steel for oil country goods. With production now at capacity

levels and the oil-gas industries receiving all of this output, voluntary allocations would serve no useful purpose, according to OIC.

It was stated, however, that consideration will be given to developing some type of program under which inventories would be limited to requirements for a specified time period.

Line pipe requirements were said to be greatly in excess of anticipated or possible production, and OIC states that it does not believe a voluntary program would alleviate present shortages.

ECA Authorized Steel And Metal Purchases Now Total \$45 Million

Washington

• • • New allocations of \$15.9 million by the Economic Corporation Administration to be spent in the United States for iron, steel and nonferrous products. Total requirements from this country are now about \$35 million.

Total metal purchase authorizations from all countries now approximate \$45 million, with the United States and Canada providing the lion's share, as of June 21.

In addition, the new authorizations included \$2.2 million for industrial equipment which, with agricultural equipment, raises the total such requirements from domestic sources to about \$6 million.

New ECA authorizations for purchase in Canada included \$5 million worth of copper (including electrolytic bars), \$3.8 million worth of zinc, and \$2.3 million worth of lead. France, Italy and the United Kingdom received the

On the remainder of the petroleum program, tentative requirements of about 740,000 tons of steel for petroleum and gas storage tanks were presented to the steel industry committee for review. The overall petroleum program will take about 3 million tons of plate, sheet and bars.

The possibility of developing a program to assist small business in hardship cases was also discussed. OIC suggested that such a program be based on individual steel companies' own methods of compliance.

bulk of the new metal authorizations.

Amounts and disposition of the new allocations from United States sources by procuring nation, amount, and general classification is as follows (all buying to be negotiated through regular trade channels):

France, \$2,000,000 for steel, \$2,750,000 for steel and tinplate; \$2,200,000 for industrial equipment including agricultural machinery, railroad equipment and mining equipment; \$1,030,000 for machinery and vehicle spare parts; \$756,000 worth of tinplate for North Africa; \$1,448,000 worth of lead; and, \$136,000 worth of zinc.

United Kingdom, \$3,500,000 worth of zinc; \$500,000 worth of lead. Another \$3,300,000 worth of zinc and \$2,300,000 worth of lead is authorized for Canadian purchase.

Italy, \$1,026,000 worth of steel including ingots, plates, billets and relay steel. Italy was also authorized to buy \$500,000 worth of copper from Chile.

New Furnace In Operation

Cincinnati

• • • An 80-ton electric arc furnace, first unit to go into operation in the Newport Rolling Mill Co.'s \$6 million steelmaking expansion program, has been lighted and is producing steel in increasing amounts toward its rated capacity of 8000 tons per month. C. Russell Feldman, president, International Detrola Corp., announced last week. The new electric furnace boosts Newport's steelmaking capacity to 43,000 tons of ingots per month.

Newport's expansion program, which is under the direction of Charles H. Stamm, vice-president, International Detrola, and general manager, Newport Rolling Mill division, includes a continuous strip mill now under construction which is scheduled for operation this fall.

Present facilities in addition to the electric furnace include seven openhearth and a blooming and bar mill at Wilder and a rolling mill and fabricating operation at Newport. A blast furnace purchased and put into operation at Martins Ferry, Ohio, furnishes pig iron to the Wilder operations.

Federal Trade Lawyer Says Proposed Steel Order Is Misunderstood

Washington

• • • Steel industry confusion over the proposed Federal Trade Commission cease and desist order (THE IRON AGE, June 24, p. 119) indicates to Lynn C. Paulson, chief trial counsel for FTC in the current steel case, only that "the industry has repeatedly misinterpreted the objectives of the Commission in this case."

In an exclusive interview with THE IRON AGE, Mr. Paulson declared that "on the basis of the simple order which I have suggest-

The impact of the Supreme Court decision, which some producers regard as law, now overshadows concern producers may have felt over FTC intent in the current Steel Case.—Editor.

ed, and would recommend to the Commission were the case to terminate by settlement at this juncture, I can see no reason for such confusion as indicated by THE IRON AGE article.

"The proposed order in its simplest form would require the steel industry to (1) put a plant price at every mill, (2) sell f.o.b. mill when requested, and, (3) refrain from getting together on freight rate factors to be used in the calculation of delivered prices."

Regarding what seems to have created the most confusion in the minds of steel officials, Mr. Paulson emphatically stated that "there is nothing in the order about freight absorption or variable mill nets. It is aimed at breaking up exclusive delivered price selling on a limited number of basing points and certainly would leave the industry free to compete in their own freight territory or anybody else's freight territory without respect to whether or not they absorb freight or have variable mill nets in doing so.

"I repeat what I have said to representatives of THE IRON AGE before, that the complaint by way of which the steel industry is before the FTC is aimed at cooperation and conspiracy in the maintenance and establishment of delivered prices. It does not contain a charge under Section 2 of the Clayton Act as did the complaint against the cement industry. It states that the FTC has reason to believe that the respondents sell ex-

Paulson Says Objectives Of Commission Have Often Been Misinterpreted

• • •

By GENE HARDY
Washington Editor

• • •

clusively at delivered prices developed and maintained around a limited number of basing points pursuant to collusion and cooperative action. The suggested order under discussion was drafted in the light of the complaint. The arguments that are being made about the cement and rigid conduit cases are not applicable to this proposed order."

Referring again to THE IRON AGE article of June 24, Mr. Paulson commented that "the article carries this rather startling statement, 'it appears to outlaw naming or recognizing a basing point at a competitor's plant.'"

The order "does nothing of the kind," he continued. "It simply says that each producer must have a plant price of his own and as to what he chooses to do when he goes out to meet competition is for him

to decide insofar as this order would be concerned. It does state, however, in no uncertain terms that each producer must have a plant price; must offer to sell f.o.b. mill on that plant price; and must not combine or conspire with his competition to establish a uniform freight rate factor for determining delivered prices or delivered price quotations."

Mission Studies Means To Boost German Production

Washington

• • • How to boost German steel production from the current rate of 4 million tons annually to the permissible limit of 10 million tons is being studied in General Clay's headquarters this week by a group of U. S. government and industry experts.

George W. Wolf, president of the U. S. Steel Export Co., heads the group which also includes Clarence B. Randall, executive vice-president of Inland Steel Corp., and Roy Bullock, of the Joint Congressional Committee on Foreign Economic Cooperation.

Other members of the mission are Ronald Clark, Gaston T. Dalenbach, and Werner P. Neuman, all of U. S. Steel Export Co., and Robert M. Lloyd, of U. S. Steel Corp. of Delaware.

Government and industry sponsors of the mission are in full agreement as to the basic purpose of increasing the present level of German steel production in the interests of European recovery and of reducing the impact of European steel requirements on the U. S. industry, according to Secretary of the Army Royall.

Decision to send the special mission to study steel production in the U.S.-British zones of occupation was reached after discussions among Paul Hoffman, Economic Cooperation Administrator; Walter S. Tower, president of the American Iron & Steel Institute; Charles S. Dewey, director of the congressional group, and other industry leaders.



LYNN C. PAULSON, chief trial counsel for FTC in the current steel case.

Industrial Briefs . . .

• **EXPANDS**—Illinois Zinc Co., Chicago, has announced that its expansion and modernization program has been completed and that Eraydo Alloy, a combination of high grade zinc, copper and other strengthening materials, is now available for delivery within 3 to 5 weeks.

• **REPRESENTATIVE** — The Ameco Co., 9113 Kinsman Road, Cleveland, has been appointed northeastern Ohio representative for the Detroit Die Set Corp., Detroit diesel and die-maker's suppliers and cutting tools and punch press equipment.

• **OPEN HOUSE**—Joseph T. Ryerson & Son, Inc., steel distributors, held open house at their enlarged Cleveland plant recently. The company completed an expansion program which included new offices and a large addition to plant capacity.

• **BUILDS NEW PLANT**—Contracts for the immediate construction of a complete new plant for the Whitman & Barnes Div. of the United Drill & Tool Corp., at 40600 Plymouth Road, Plymouth, Mich., have just been awarded to the Austin Co. The project will involve an expenditure of more than \$2.5 million.

• **EASTERN OFFICE**—The Marley Co., Inc., Kansas City, manufacturers of cooling towers, water cooling equipment and spray nozzles, has announced the opening of a new district office in Philadelphia at 1112 Packard Bldg. Robert M. Sharp is in charge.

• **WELDING AWARDS**—The American Welding Society recently presented cash prizes totaling \$700 in the 1948 A. F. Davis Undergraduate Welding Award program at Ohio State University, Columbus, and at the Rose Polytechnic Institute, Terre Haute, Ind.

• **ORE CARRIER**—Inland Steel Co., Chicago, has announced the letting of a contract to the American Ship Building Co. of Cleveland for the construction of a new ore carrier.

• **NEW SCRAP FIRM**—Announcement has been made of the formation of the Burstein Co. which will specialize in the sale of iron and steel scrap. Charles C. Burstein will head the new company with headquarters in the Keenan Bldg., Pittsburgh.

• **WEST COAST PLANT**—Chrysler Corp., Detroit, has announced that it has recently expanded its operations on the West Coast by opening the new Dodge San Leandro plant in California, for the assembly of Dodge passenger cars and Dodge job-rated trucks.

• **DESIGN AWARDS**—Awards totaling \$500 for the design of small bridges by college engineering students have been announced by the American Institute of Steel Construction. First prize of \$250 went to Jim Brodt, Iowa State College; second prize, \$150, to William Kasper, New York University, and third prize, \$100, to John F. Hogan, Iowa State College.

• **BUYS DIE PLANT**—The Reed Rolled Thread Die Co. of Worcester has purchased the Cleveland Die & Mfg. Co., Cleveland manufacturers of thread rolling dies. Henry Bockelman will continue as manager of the Cleveland plant until it is moved to Worcester and will then act as consultant for the Reed company.

• **BRANCH OFFICE**—Barium Steel Corp. has announced the opening of its Washington office located at DuPont Circle Bldg., 1344 Connecticut Ave., N.W. W. E. Jubien has been appointed Washington representative.

Big Demand For Steel Construction Seen As Stabilizer of Business

New York

• • • The fabricated steel business is booming. How long it will stay that way none of the engineers of the American Institute of Steel Construction would say at a meeting of the district engineers here. But from every section of the country came reports of the overwhelming demand for fabricated steel—far in excess of the supply.

Department stores everywhere are modernizing and the trend is increasing. Despite high building costs, merchants seem to be going right ahead with their plans. Bridge engineers are booked up solid for at least 2 years. Small apartments and buildings are cropping up overnight.

Volume in commercial and industrial buildings continues unabated. Owners are most anxious to invest new profits in plant and office expansion and modernization.

Business activity is following the trend that there will be no great reduction in building costs for some time to come. So construction of public buildings such as churches, schools and hospitals cannot be put off any longer.

"In some other fields of building construction, high costs are beginning to act as a break," L. Abbott Post, executive vice-president of the institute, warned. The volume of the investment type of building is being held down. Private capital promoters are timid because rental return is too low to offset high construction costs. The same is true of multi-story office buildings. More venturesome builders in various parts of the country, however, are going ahead regardless of cost.

Labor continues to be plentiful. Building permits in most cities are breaking all records. By the end of the year the total tonnage of fabricated steel is expected to be greater than last year. If there is any increase in large investment building, complete facilities of the steel fabricating shops will be needed for years to come. In any event, no immediate break in the structural building boom can be seen.

Machine Tool Builders May Get Reimbursement For Blocked Equipment

Cleveland

• • • Some 46 machine tool builders, whose \$8 million in orders for Russia and her satellite nations have been blocked since Mar. 1, will be reimbursed under an authorization in the bill for Foreign Relief, if President Truman signs it, according to Tell Berna, general manager, National Machine Tool Builders Assn.

On June 19, Congress sent the Foreign Relief bill, which appropriates the money required by Paul G. Hoffman for the Economic Cooperation Administration for the next 12 or 15 months, to the White House.

In the bill is the following sec-

tion: "Whenever an export license for a commodity or shipment of which to a nonparticipating country was contracted for in good faith prior to Mar. 1, 1948 is denied or cannot be obtained under Sec. 6 of the Act of July 2, 1940 (54 stat. 741), as amended, the Administrator shall provide for the procurement of such commodity to transfer to a participating country in accordance with the requirements of such country, at not less than the contract price of such commodity to the producer or exporter, as the case may be, including any cost incurred in converting the commodity to meet the requirements of the participating country."

If President Truman signs the bill, Mr. Berna said, machine tool builders must first get cancellations from their customers, even though

this section of the bill relieves builders of all responsibility.

Fortunately, about \$4 million, or half of the blocked machines, can be readily disposed of by the machine tool industry. The other half of the machines are special, and made up metric as well, and disposal will probably require the mutual efforts of the National Machine Tool Builders Assn., ECA and the Dept. of Commerce.

Will Build Tankers

• • • Standard Oil Co. of California announced that it has awarded contracts for five big tankers to Bethlehem Steel Corp. They will be of 240,000 barrel capacity each and will be built at either Sparrows Point or Quincy, Mass.

AMERICAN IRON AND STEEL INSTITUTE
SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING ALLOY AND STAINLESS
(Net Tons)

APRIL - 1948
Month

Steel Products	Number of companies	Items	Current Month				To Date This Year				Whole Year 1947			
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)		Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale		Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)		Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale		Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)		Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale	
			(Net Tons)	Per cent of Total Shipments	(Net Tons)	Per cent of Total Shipments	(Net Tons)	Per cent of Total Shipments	(Net Tons)	Per cent of Total Shipments	(Net Tons)	Per cent of Total Shipments	(Net Tons)	Per cent of Total Shipments
Ingot, blooms, billets, tube rounds, sheet and tin bars, etc.	45	1	210,859	4.1	250,173	4.8	1,021,790	4.8	1,066,091	4.7	2,966,748	4.7	2,396,343	4.7
Structural shapes (heavy)	12	2	302,244	5.9	2,882	6.3	1,342,878	6.3	11,095	7.0	4,436,129	7.0	2,640	7.0
Steel piling	4	3	21,083	0.4	-	0.5	99,356	0.5	8	0.5	324,224	0.5	23	0.5
Plates (sheared and universal)	29	4	528,040	10.4	23,648	10.4	2,226,603	10.4	127,819	10.1	6,345,216	10.1	219,227	10.1
Skelp	6	5	11,526	0.2	19,280	0.2	52,405	0.2	139,167	0.3	160,989	0.3	384,004	0.3
Rails—Standard (over 60 lbs.)	4	6	126,030	2.5	265	3.0	636,745	3.0	3,518	3.5	2,207,146	3.5	991	3.5
—All other	5	7	18,996	0.4	191	0.4	87,149	0.4	595	0.3	211,900	0.3	329	0.3
Joint bars	7	8	13,065	0.3	3,275	0.2	49,636	0.2	12,504	0.3	173,923	0.3	15,198	0.3
Tie plates	7	9	39,699	0.8	32	0.8	165,730	0.8	211	0.8	504,779	0.8	4,437	0.8
Track spikes	8	10	9,322	0.2	-	0.2	44,924	0.2	90	0.3	163,746	0.3	146	0.3
Hot Rolled Bars—Carbon	34	11	481,406	9.4	42,898	9.7	2,081,139	9.7	215,808	9.9	6,242,416	9.9	745,770	9.9
—Reinforcing—New billet	16	12	102,888	2.0	449	2.0	438,588	2.0	2,363	2.0	1,277,075	2.0	9,775	2.0
—Rerolled	13	13	19,850	0.4	-	0.3	60,490	0.3	-	0.3	175,833	0.3	-	0.3
—Alloy	27	14	152,515	3.0	20,542	2.9	629,398	2.9	77,185	2.8	1,741,432	2.8	212,382	2.8
—TOTAL	44	15	756,659	14.8	63,889	14.9	3,209,612	14.9	295,356	15.0	9,436,756	15.0	967,927	15.0
Cold Finished Bars—Carbon	27	16	107,668	2.1	543	2.1	459,231	2.1	1,516	2.3	1,426,701	2.3	9,249	2.3
—Alloy	26	17	20,537	0.4	311	0.3	71,382	0.3	1,564	0.3	218,802	0.3	2,601	0.3
—TOTAL	35	18	128,205	2.5	854	2.4	530,613	2.4	3,080	2.6	1,645,503	2.6	11,850	2.6
Tool steel bars	19	19	7,461	0.1	139	0.1	27,664	0.1	445	0.1	87,279	0.1	1,670	0.1
Pipe & Tubes—Butt weld	15	20	151,040	3.0	2,227	3.0	643,120	3.0	9,336	3.0	1,892,691	3.0	78,080	3.0
—Lap weld	8	21	24,449	0.5	3	0.5	118,201	0.5	3	0.6	389,762	0.6	875	0.6
—Electric weld	15	22	101,312	2.0	439	2.3	483,319	2.3	1,673	2.0	1,254,325	2.0	4,274	2.0
—Seamless	17	23	241,511	4.7	13,753	4.4	945,289	4.4	58,602	4.1	2,581,106	4.1	157,208	4.1
Wire rods	19	24	45,957	0.9	25,099	1.0	217,453	1.0	103,524	1.1	667,282	1.1	331,192	1.1
Wire—Drawn	39	25	212,793	4.2	13,730	4.2	897,553	4.2	59,873	4.1	2,590,963	4.1	181,783	4.1
—Nails and staples	17	26	73,733	1.4	1,366	1.4	290,320	1.4	5,065	1.3	799,436	1.3	8,481	1.3
—Barbed and twisted	15	27	20,454	0.4	20	0.4	88,705	0.4	48	0.4	256,991	0.4	128	0.4
—Woven wire fence	15	28	33,047	0.7	391	0.6	133,703	0.6	1,143	0.6	407,295	0.6	3,616	0.6
—Bale ties	11	29	9,441	0.2	-	0.2	39,938	0.2	-	0.2	119,917	0.2	-	0.2
Black Plate—Ordinary	9	30	63,876	1.3	-	1.2	260,087	1.2	562	1.3	801,745	1.3	2,033	1.3
—Chemically treated	2	31	2,135	-	-	-	4,447	-	-	-	19,252	-	-	-
Tin and Terne Plate—Hot dipped	8	32	168,627	3.3	27	3.1	656,179	3.1	99	3.3	2,093,149	3.3	228	3.3
—Electrolytic	9	33	141,060	2.8	-	2.6	560,969	2.6	215	2.6	1,617,659	2.6	529	2.6
Sheets—Hot rolled	32	34	606,156	11.9	50,294	12.0	2,563,720	12.0	220,160	12.5	7,891,798	12.5	578,426	12.5
—Cold rolled	16	35	567,756	11.1	1,823	10.3	2,202,899	10.3	6,981	8.7	5,504,578	8.7	28,498	8.7
—Galvanized	16	36	136,393	2.7	288	2.5	536,975	2.5	1,015	2.5	1,609,881	2.5	889	2.5
Strip—Hot rolled	23	37	151,618	2.6	34,805	2.6	554,831	2.6	121,492	2.7	1,740,085	2.7	308,655	2.7
—Cold rolled	33	38	148,286	2.9	1,983	2.7	580,016	2.7	7,977	2.6	1,613,005	2.6	28,030	2.6
Wheels (car, rolled steel)	5	39	25,743	0.5	31	0.5	105,418	0.5	355	0.6	356,873	0.6	2	0.6
Axles	5	40	17,585	0.3	1	0.3	65,256	0.3	75	0.3	185,019	0.3	53	0.3
All other	-	41	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL STEEL PRODUCTS	140	42	5,096,161	100.0	510,908	100.0	21,443,573	100.0	2,258,177	100.0	63,057,150	100.0	5,717,765	100.0

During 1947 the companies included above represented 99.5% of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Adjusted.

Draft Bill Sleeper Provides for Surprise Govt. Steel Allocation

Washington

• • • Twenty pct compulsory set-aside of steel output.

That's what it may amount to. Congressional standard-bearers for mandatory controls are still chuckling and anticontrol solons are still trying to figure out how it happened.

At any rate the new draft bill, signed into law this week by President Truman, includes a guarantee that small business will receive all the steel it needs for defense orders.

The guarantee was slipped into the controversial draft bill by Chairman Ploeser, R., Mo., of the House Small Business Committee. Small business estimates that it has been receiving only about 4 pct of the total steel output in recent months. The guarantee amendment should up this to somewhere between 15 and 20 pct, according to Mr. Ploeser.

Control-minded congressmen had expected Mr. Ploeser to introduce his set-aside proposal in the form of a bill. But such a bill would have hit insurmountable hurdles in both Senate and House, and Mr. Ploeser knew it. So he waited until House military leaders were making a last desperate attempt to save the draft bill and then threw in his amendment providing for set-asides. There was no objection—either from Republicans or Democrats. Caught off guard and with only a few hours to go before adjournment, Congress agreed to Mr. Ploeser's proposal.

Briefly, the new law states that the President is empowered (through the Secretary of Defense) to require steel producers to supply all the steel that any concern having a defense contract can use to fulfill such a contract.

Putting it another way, if you hold a defense contract with the federal government and can't get enough steel to carry out that contract, tell the Secretary of Defense about it. The Ploeser amendment says the Secretary of Defense will put the finger on the steel producers to see that you get it.

The fact that there isn't enough steel to go around this year—and probably won't be next year—

Ploeser's Strategic Proposal Enacted As Law Without Normal Controversy

By GEORGE BAKER
Washington Bureau

doesn't bother Mr. Ploeser at this time. Somebody is going to get the short end of the stick. Meanwhile, the thing to do is to get yourself a defense order and let Secretary Forrestall figure out where the steel's coming from.

But producers are on the spot, too. The Defense Dept. tells the ABC Steel Corp. to ship 100 tons of steel a month to the XYZ Fabricating Co. Listen to this: "Compliance with such requirement shall be obligatory on all such producers of steel and such requirement shall take precedence over all orders and contracts theretofore placed with such producers."

"If any such producer of steel or the responsible head or heads thereof refuses to comply with such requirement, the President,

through the Secretary of Defense, is authorized to take immediate possession of the plant or plants of such producer, and, through the appropriate branch, bureau, or department of the armed forces, to insure compliance with such requirement.

"Any such producer of steel or the responsible head or heads thereof refusing to comply with such requirement shall be deemed guilty of a felony and upon conviction thereof shall be punished by imprisonment for not more than 3 years and a fine not exceeding \$50,000."

Mr. Ploeser's amendment also states that the President "shall recognize the valid claims of American small business" to participate in the defense program. It provides that small business shall receive a "fair share" of orders placed exclusively for the use of the armed forces or other federal agencies. "Small business" is defined as an enterprise not dominant in its trade or industry, employing fewer than 500 persons, and independently owned and operated. As in wartime, the President is authorized to seize any plants or factories that fail to fill armed service orders at a fair price.

New Draft Law Threatens Balanced Steel Shipments

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

Pittsburgh

• • • The steel allocations section of the draft law may not disrupt steel shipments but it has the power to do so, steel men believe. How much it changes the steel picture depends upon Washington. Some here see in it a seedling that may grow into the priorities tangle of early World War II. Others prefer to listen to those who assure them the allocations power will not be put to use now.

Commerce Secretary Sawyer is in the latter group, but it is Defense Secretary Forrestall, not he, who would administer the order if

the President gave him the nod. And President Truman is on record in favor of Federal allocation power over steel. The cheerful-outlook school also believes that Gov. Dewey may be President in 1949 when the bulk of the arms orders now authorized will probably be rolled. They will admit that schedules could be somewhat disrupted by then, however.

Those who claim to be more hard-headed are now discussing the ramifications of this section of the new act. Most steel officials agree that whether the allocations power is actually used or not it will hang heavy over their heads like the sword over Damocles.

Steel companies will probably not make a frontal attack toward off allocations. They will continue

to ship steel needed by the armed forces as they have been doing. They may bring this matter under the voluntary allocations setup. This would assure more equitable distribution of orders among various producers and keep the Washington end of steel distribution in one department, Commerce, where it belongs.

Depending on Washington, the allocations sections of the Draft Act may take one of three courses:

(1) *Allocation power not invoked*—Probable dislocation in shipment pattern in some products as rearmament orders increase. Industry officials expected this. They have been taking armament orders for months and giving them special treatment with some loss to regular customers. But they have repeatedly asked the Government to set up an agency to screen orders and determine their relative importance. They don't think they should have to push aside a good customer to ship shapes to an army project 6 months before the foundation is poured.

Allocation power remains as potent threat over head of steel sales officials. But if armed forces don't make unreasonable demands—if producers are allowed to work their orders into balanced schedules—overall dislocation of steel shipments will be slight. Some products like openhearth and electric furnaces are almost certain to remain hard to get, may grow tighter.

(2) *Allocation power invoked but limited to steel for products actually ordered by armed forces*—Red tape will begin to take its toll. Steel men will be moved to Washington to help. Contractors, subcontractors and sub-subcontractors will ask for and probably get directives. Stiff penalty provisions will insure such orders getting "precedence over all orders and contracts theretofore placed with such producers." How "precedence" is interpreted by Washington will determine how much overall steel production is affected and normal shipment patterns disrupted.

To observers here, the "precedence" clause appears to be more drastic than the Controlled Materials Plan of World War II. Orderly scheduling was generally permitted then—though it was easier because individual orders were larger. Haphazard scheduling (time, not product, the key factor) would cut total steel output by time consuming changes of rolls, etc.

(3) *Allocation power invoked and applied to any steel product required by the armed forces*—This is the eventuality steel men dread. Many of their customers, big and little, have repeatedly said they did not want government controls in the guise of assuring them more steel. But steel company attorneys think the law might be stretched this far if the Administration wanted to do so. Freight cars, inland barges, ships and pipe lines—all essential to national defense—might be brought in to an allocations program.

If by one means or another the Draft Act is ever interpreted this broadly in Washington, many steel men predict a repetition of the hectic early days of World War II. Assuming no change in the international situation the very lack of

an emergency would, it is believed, make for more priorities confusion than ever before. Log rolling and politicking would be inevitable, many believe, with the spoils going to those who know the angles or pull the right strings.

Free Imports For Show

• • • Imports of machinery and other industrial commodities will be admitted duty-free to the International Industrial Exposition at Atlantic City. This suspension of import duties on goods earmarked for the exposition has been signed into law by President Truman. Opening on June 26, the industrial show is scheduled to run through September 11.

50 YEARS AGO

THE IRON AGE, June 30, 1898

• "Taking the country at large, developments in the iron trade are not of a particularly satisfactory nature. Prices continued low this week and there does not seem to be much prospect of ample employment in the near future. In Pittsburgh there has not been enough steel selling this week to establish a price."

• "The preface to the directory of iron and steel works which has just been issued by AISI contains some interesting information. Capacity of the 420 blast furnaces operating in April is 19,081,578 per annum; that of 504 rolling mills and steel works, 17,929,850 gross tons finished products; that of 45 Bessemer plants with 100 converters, 10,633,000 tons of ingots; and of the 286 openhearth furnaces, 3,522,250 tons."

• "The great commercial development of the new century is looked for by many in the countries bordering on the Pacific

Ocean, since they believe that the highest rate of growth in the commerce of the Atlantic probably has been reached."

• "A special automatic high-speed roll and dial feed press has been built by E. W. Bliss Co. for the manufacture of paper fasteners. This press which makes as high as 125 strokes per min takes metal from the coil and advances it by means of a single roll feed to the punching dial plate which carries it to the bending and shaping tools."

• "Carnegie Steel Co. Ltd. has started the development at Homestead of what will be known as the No. 3 openhearth plant. The erection of this unit is a further step in the attainment of the ultimate end of employing basic openhearth steel exclusively for the structural finished material and plates made at the Homestead works."

Construction Steel . . .

New York

• • • The estimated total shipments of fabricated structural steel for the month of May, reported at 168,522 tons, were the highest for any month in the current year, according to data received by the American Institute of Steel Construction, Inc. For the first 5 months of the year the shipments amounted to 785,816 tons, or 8 pct greater than for the same period in 1947.

Bookings were somewhat off to 131,843 tons as compared with 150,710 tons for the previous month. However, the bookings for the first 5 months totaling 786,429 tons were 20 pct greater than the 654,780 tons reported in the corresponding period in 1947.

The backlog, or tonnage available for fabrication, within the next 5 months only is 593,380 tons.

Following is the complete tabulation of bookings and shipments:

	Estimated Total Tonnage for the Entire Industry 1948	Estimated Total Tonnage for the Entire Industry 1947	Estimated Total Tonnage for the Entire Industry Average 1936, 1940
Contracts Closed			
January ..	160,634	104,973	107,578
February ..	130,119	125,881	96,280
March	213,123	149,634	124,558
April	150,710*	161,338	110,783
May	131,843	112,954	126,237
Totals ...	786,429	654,780	565,436
Shipments			
January ..	146,363	140,650	92,578
February ..	141,556	136,126	88,626
March	167,029	137,799	115,031
April	162,346*	157,392	123,650
May	168,522	154,980	123,225
Totals ...	785,816	726,947	543,110
Tonnage available for fabrication within the next 4 months	593,380	634,209	337,237
* Revised			

• • • Fabricated steel awards this week included the following:

375 Tons, Napa, Calif., 2 bridges across Napa River and Cayetano Creek, through Erickson-Phillips & Weisberg, to Moore Drydock Co., Oakland, Calif.

230 Tons Buffalo, and Ft. Wayne, Ind., sorting bins and hoppers for Allied Mills Inc. through James Stewart Corp. to Lackawanna Steel Corp. and Ft. Wayne Structural Steel Co.

• • • Fabricated steel inquiries this week included the following:

2700 Tons, Lawrenceburg, Ind., power house for Indiana-Michigan Electric Co.
1165 Tons, Oakland, Calif., undercrossings and overcrossings on East Shore Freeway between 50th and 38th Aves., California Div. of Highways, Sacramento, July 21.

125 Tons, Northampton, Mass., two bridges and approaches, South St. and Clarke Ave.

110 Tons, Newburyport and Salisbury, Mass., new grid floor of bridge over Merrimack River on Route 1.

• • • Reinforcing bar awards this week included the following:

1500 Tons, Chicago, Chatham Park Tower Apartments, to Cherry-Richards Co., contractors.

200 Tons, Brooklyn, manufacturing building for J. Finkel through Pioneer Engineering Corp., contractor to Capitol Steel Corp. of N. Y.

100 Tons, Brooklyn, dormitory for Watchtower Bible & Tract Society Inc. through Skinner, Cook & Babcock, Inc., contractor, to Capitol Steel Corp. of N. Y.

• • • Reinforcing bar inquiries this week included the following:

1000 Tons, Sault Sainte Marie, Mich., U.S. Engineers, Detroit Office, United Construction Co., Winona, Minn., low bidder.

460 Tons, Oakland, Calif., undercrossings and overcrossings on East Shore Freeway between 50th and 38th Aves., California Div. of Highways, Sacramento, July 21.

360 Tons, Chicago, warehouse and office building for Hordors, Inc.

170 Tons, Chicago, Home for Aged Jews.

155 Tons, Boston, Mass., bridge and approaches Fort Point Channel, Dorchester Ave.

New Officers Elected At Purchasing Agents Assn.

Chicago

• • • Wallace B. Burnet, purchasing agent for Imperial Brass Mfg. Co., was elected president of the Purchasing Agents Assn. of Chicago, at its June 10 meeting. Arthur F. Dallia, Justrite Mfg. Co., is the association's new first vice-president and Milford Hunter, Continental Can Co., Inc., has been elected second vice-president. Carl L. Otremba will serve a second term as national director of the association.

Preston C. Patch, Kropp Forge Co.; Frank W. Shymkus, Acme Steel Co., and Herbert C. Hill, Dole Refrigerating Co., were elected to the association's board of governors. The board is also composed of W. D. Jackson, Container Corp. of America; E. S. Page, Great Lakes Carbon Co.; Robert Sedgwick, Chicago Hardware Foundry; Robert Doyle, Glidden Co.; J. F. Knight, University of Illinois; and E. A. Fandell, the Northern Trust Co. Larry Seen, Borg & Deck Div., Borg Warner Corp., has been re-elected for his eleventh consecutive term as secretary and Harry Wise, Scovill Mfg. Co., enters his ninth consecutive term as treasurer.

Pipeline Action Deferred

Washington

• • • Action by the Office of International Trade on pending applications for exports of pipeline by the Trans-Arabian Pipeline Co. has been passed over until the first week in September. New allocations will be made at that time.

• • • Piling inquiries this week included the following:

100 Tons, Middletown, Conn., three-span rolled beam bridge and grading.

• • • Railroad car awards this week included the following:

The Western Maryland Ry. Co. has ordered from Greenville Steel Car Co. 200 50-ton capacity steel drop end gondola cars, and has ordered from Pressed Steel Car Co. 200 steel sheathed box cars and 50 70-ton capacity gondola cars. The Nashville, Chattanooga and St. Louis R.R. has ordered 1000 50-ton hopper cars from Pullman Standard Car Mfg. Co., Bessemer, Ala. The Norfolk & Western R.R. has ordered 1000 70-ton covered hopper cars from the Virginia Bridge Co. Missouri and Pacific R.R. has ordered 1000 70-ton hopper cars from Bethlehem Steel Co. and this road will build another 1000 70-ton gondolas at their own shops in De Soto, Mo. New York Central has ordered 30 130-passenger car, multiple units from the St. Louis Car Co.

Trans-Arabian had asked that 16,000 tons of heavy pipe be shipped during the second quarter and 52,000 tons during the third. In postponing action, OIT officials said this did not prejudice applications by the company for export of materials other than heavy pipe to continue work on the line.

Ore Consumption Reported

Cleveland

• • • Consumption of Lake Superior iron ore by U. S. and Canadian blast furnaces in May totaled 6,656,498 gross tons, compared with April consumption of 4,976,069 gross tons and May 1947 consumption of 6,884,803 gross tons, according to the monthly report of the Lake Superior Iron Ore Association.

Cumulative consumption at the end of May reached 31,764,063 gross tons compared with 33,730,770 tons for the same period in 1947.

Iron ore on hand at furnaces and Lake Erie docks totaled 22,058,158 tons June 1, the Association reported, compared with 17,124,962 tons May 1, and 17,618,341 tons June 1, 1947.

Made Steel Consultant

Washington

• • • ECA Administrator Paul G. Hoffman has appointed Clarence B. Randall, Inland Steel Co. vice president, as principal steel consultant to Langbourne M. Williams, Jr., in the Economic Cooperation Administration's Paris office.

Weekly Gallup Polls . . .

Big City Voters Seen Holding Key to 1948 Elections

Princeton, N. J.

• • • Once the presidential nominations are completed, the decision as to who will sit in the White House for the next 4 years will rest very largely with the voters of the big cities, according to George Gallup, director, American Institute of Public Opinion.

They hold one of the most important keys to the 1948 presidential election. Current institute polls on party strength give the G.O.P. an advantage over the Democrats in the big cities taken as a group.

The Republican party made heavy gains in the big cities in the Congressional elections 2 years ago. In terms of seats in the House, the greatest gains came in northern big city districts, which had been strongholds of the Democratic party during the Roosevelt era. These districts accounted for 29 of the 56 seats gained in 1946 by the G.O.P.

One factor that is aiding the Republicans today is the strength of Henry A. Wallace in the big cities. Wallace support comes heavily from voters who were Democratic in 1944. If Wallace were not a candidate this year, the race between the Republican and Democratic parties in the big cities would undoubtedly be a lot closer than it is.

Big city voters were asked by the institute:

"Which party do you want to see win the Presidential election this fall—the Republican, Democratic or Wallace's third party?"

The vote of cities of 500,000 population or more averages as follows:

BIG CITIES

	Pct
Republican Party	46
Democratic Party	36
Wallace's Party	7
No opinion	11

In interpreting the above results it should be borne in mind that the

survey was conducted during the last week in May and the first week in June when President Truman's popularity was at a fairly low ebb, and before his trip to the West. The President and the Democratic party have made phenomenal comebacks in popularity before, and may do so again. The current survey report is no indication of what may happen in November; it indicates simply that, as of about June 1, the GOP position in the big cities was favorable.

• • • If you were president of the United States what would you do?

That question was put to thousands of average men and women in all parts of the country, and the answers which the plain people gave are intensely revealing as to what kind of leader we Americans want a president to be.

We want him, above all else, to be a humanitarian, a benevolent father, a helper and protector of the common man. The typical American says that if he were president he would devote his energies to helping people and trying to make them happy.

This conception of the kind of

Poll Indicates Helping The Common Man Emphasized in Thinking About Presidency

o o o

man who should be president is expressed in many ways by the people questioned in the poll: "I would try to do something to make the people in the slums happier . . . So many children don't get enough to eat, I'd want to try to help . . . I'd fight for the poor people and see that they don't get fooled by the rich and greedy . . ."

The public's desire for a "great White Father" in the White House has a bearing on the 1948 presidential campaign. Humanitarian appeals can be powerful vote getters.

Besides wanting to help and protect the common man, here are the main things which the typical American would want to do if he were president:

Improve economic conditions, improve democracy, try to bring about world peace, promote religious teachings and improve the education of the people.

Coming Events

July 16-24 American Road Builders' Assn., convention and Road Show, Soldier Field, Chicago.

July 26-27 Institute of Scrap Iron & Steel, midyear meeting, Atlantic City.

Aug. 30-Sept. 3 American Chemical Society, national meeting, Washington.

Sept. 6-10 American Chemical Society, national meeting, St. Louis.

Sept. 13-17 American Chemical Society, national meeting, Portland, Ore.

Sept. 13-17 Instrument Society of America, conference and exhibit, Philadelphia.

Sept. 28-Oct. 1 Assn. of Iron & Steel Engineers, Convention and Iron and Steel Exposition, Cleveland.

Oct. 5-7 Industrial Packaging Engineers Assn., Industrial Packaging and Materials Handling Exposition, Chicago.

Reports Business Spotty With No Promise of Immediate Pickup

• • • Business was spotty this week in major sales sectors with no promise of a pickup in the immediate future and trade sources in Chicago, Cleveland and Detroit, to name a few, ascribe the current scarcity of new firm orders to a variety of causes, old and new, some of which are certainly valid.

Industry observers are generally agreed that summer is a seasonally dull period, a statement hallowed by age, but proved by past performance with plant vacations, inventory, time, etc.

Others believe the uncertainty of an election year is holding up some of the programs, and predict that the machine tool business will be slow until the election is over. This assumes a Republican president.

Some believe that because of the raw material requirements of the defense program and ECA, machine tool buyers are afraid of shutdowns in their plants for lack of material, steel, etc.

Still others believe that the third round of wage-price increases poses a problem for some plants and until they're certain they can meet it, money for capital equipment is nil.

A few believe that for the present boom, or whatever term can be properly applied to this particular phase of the business cycle, the plants and shops are adequately tooled up.

Very few hold the opinion that machine tool prices have anything to do with it, pointing out that only in the smaller plants and shops is price resistance encountered, although a price differential of \$500 will turn a sale, it is reported, in such cases.

In any event, the machine tool market has been in a deceptively dull condition since the last round of price increases, and business, as mentioned before, is extremely spotty. A very few companies have reported a bulge in June orders, and that June is turning out to be a better month than May. This buying reportedly takes in more than defense orders, which are

Some Believe Uncertainty Of Election Year Holding Up Tool Programs

seeping through in a very faint trickle, meaning that some companies are buying either because they anticipate further price increases in machine tools, or because they are afraid of the government coming in and taking over the total output.

This is contrary to the broad sales pattern however, and new firm orders in most cases are leveling off, with the second quarter ending up smaller than the first, but offering the hope that sales will not hit the depths of last year before the Machine Tool Show. In simplest terms, the machine tool industry can't expect much until the government begins to buy.

According to reports, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has purchased Cincinnati Planer Co., Cincinnati, for a reported \$3 million.

In the meantime, wage negotiations are opening up in some segments of the industry. In Torrington, Conn., Hendey Machine Co. has announced that under a new contract signed recently with Henderson local of the United Automobile Workers (CIO), a wage increase of 5¢ per hr has been granted. Bonus pay for six holidays was also guaranteed. The contract became effective June 7, 1948, having been ratified by union members June 10. It will be in force 1 year.

In Detroit, the current tool and die strike has let out considerable steam from the machine tool market, it is reported. While the present lull indicated by many seg-

ments of the industry can hardly be accounted for by the tool and die strike, there is no doubt that the slowing down of tool and die work for new GM and Chrysler models has been accompanied by a marked falling off of machine tool ordering.

At the moment, only two major tooling programs for auto car makers are indicated; no substantial placements were reported during the past week. Even ordering of tools by small shops, which has been a buoying factor in the tool market here, has fallen off noticeably.

With current reports indicating a near termination of the tool and die strike, most Detroit sources are convinced a somewhat quicker tempo for machine tools lies immediately ahead.

Canada's Exports Rise

Ottawa

• • • Minerals exported from Canada in the first four months of this year had a value of \$142,990,000, an increase of \$41 million over the like period of 1947. Aluminum exports constituted the greatest part of the increase, being up from \$11,679,000 to \$30,461,000, but Aluminum Co. of Canada states that this increase must not be taken as a criterion of a similar increase in 1948 production and sale over last year, since stocks are often held at Arvida for many months before delivery.

Exports of copper and its products amounted to \$25,503,000 for the first four months, up from \$13,148,000 in the same period last year. Nickel exports totaled \$25,163,000 up from \$18,507,000. Exports of lead and its products were approximately the same at \$8,749,000 in the four months this year, while zinc exports declined to \$9,962,000.

Strong Undertone, Few Price Changes Seen

New York

... A strong undertone featured the Nation's scrap markets last week while consumers were applying pressure at many points to hold prices within the established formula. At the same time mills were cudgeling their suppliers to get in more scrap tonnage despite dwindling yard volume. This development nearly upset the apple-cart when one factor raised its buying price in the East to the equivalent of the mill price in order to get in more tonnage.

Price developments in the market were negligible so far as open market scrap was involved, but the talk of scrap-for-steel deals indicates a growing volume of transactions. Upgrading of scrap is common, but in some markets consumers are cracking down on this practice by rejecting cars. A very tight control is still being exercised by some mills over their scrap producing steel consumers. There are no limits to the freight hauls involved in these return scrap transactions. Scrap produced along the eastern seaboard from steel bought in Pittsburgh must be returned to Pittsburgh. The mills exercise close control over the scrap tonnages involved.

Looking into the future, market observers see no let up in the tightness of scrap supplies this year while the ingot rate continues at its present high level. So far, foreign scrap has been received in this country in only token tonnages, but the hope persists in mill and government breasts that larger tonnages may yet be wrested from foreign sources. The mills should now be building up stockpiles to hold them through the winter. Reports from some markets indicate that this is proceeding to a minor extent, but the overall picture is one of balance between scrap shipments and consumption. The cause may be looked for in the yards where the spring flood of scrap has passed without leaving any comfortable margin over current consumption.

PITTSBURGH—Prices on all grades were stagnant during the past week. Cast demand appeared to be somewhat limited as the coal mine vacations cut beehive coke supply, now the main source of foundry coke in the district. Shipments of steel grades are holding up well. Mills are laying down some material, though not as much as they'd like to at this time. Short shoveling turning quality continues poor and rejections on this grade are high. Rising yard costs are blamed by dealers for the fact that preparation and segregation are not what they used to be.

CHICAGO—Those who expected a weakness during the summer months appear now to have guessed wrong. The market remains very strong. One large Chicago broker is still paying \$40.50 for heavy melting but observers report this is a deal involving new product. Carnegie's top price on remote out of the Southwest is about \$44.00 delivered. A St. Louis producer last week started to meet the Pittsburgh remote price on material from Southwest areas. Shipments are holding up well. Cast scrap is still strong with foundries competing for the better grades.

PHILADELPHIA—The market here was on the strong side last week but there were no developments that warranted higher prices on any grade. It is learned that one broker has been offering a 50¢ premium for No. 2 scrap for shipment to Pittsburgh, but this has since been withdrawn. Dealers were afraid to chance shipments at the current high freight rate lest cars be rejected. They have no trouble selling in the local market as mills are anxious to get all the scrap they can. Yard intake is universally reported to have declined sharply and mills will be hard put to get enough scrap to carry them through the winter at the present operating rate. Cast grades remain firm in this market and are in even greater demand due to the closing down of the small Alan Wood furnace. Some sources report that they have been unable to obtain awards from railroad and industrial lists at price that brought results formerly.

CLEVELAND—Demand continues to exceed supply and the market here and in the Valley is stronger than a bull pup. Shipments to major consumers are off a little bit from last week, and the bulk of the free scrap is going to consumers not on the formula. Blast furnace is practically the only item without undue strength at the moment, because of quality, but the only price changes are those that cannot be pinned down. Good foundry material is strong. But a lot of mixed cast is being offered. Consumption is high, particularly openhearth, and buyers are battling all the way, although there have been no formal resignations by members of the formula club.

DETROIT—In Detroit there are a growing number of reports of deals for scrap at over-the-formula prices allegedly involving outside mills but local buying is said to be at formula prices. Some sources look for a showdown in the very near future. With the tool and die strike continuing, the cast market is weak and the volume of sales is very low. No price changes are reported this week and scrap flow with few exceptions continues at better than average levels according to most sources.

BUFFALO—Steel mill scrap tightened sharply last week as supplies shrank. Dealers were reported paying the full formula in some instances, and even premiums, to fulfill contracts. Sales of machine shop and shoveling turnings were made to nearby consumers on the basis of \$35.50 and \$36.50 Buffalo, an advance of 50¢ a ton on that type of business. Low phos plate was firm, with ordinary stuff listed at \$44.75 and choice, heavy cut to 12-in. lengths up to \$46.00. Cast scrap was reported firmer, more in reflection of the improvement in order sections of the list than any new buying.

BIRMINGHAM—Scrap dealers here report a considerable decrease in receipts of all grades. This slump in flow of yards is attributed both to the season and to steady consumption that has reduced accumulation of material. Demand remains heavy and prices are firm.

NEW YORK—Scrap is increasingly scarce in this district but mills continue to hold to formula prices. A mill buying No. 1 exclusively, but unable to obtain enough of that grade, bought 50 to 75 cars of No. 2 in this market during the week. Dealers report that in addition to small returns from collectors, shipyard repair scrap and utility scrap volume is very low. The upgrading of scrap has continued but there is a growing wave of rejections by mills. This does not indicate that mills' stocks are adequate, but merely that scrap shipments are growing worse.

CINCINNATI—Little change has taken place in the market during the past week, all grades are in strong demand, with supply relatively weak. Plant vacation periods have slowed up foundry grade consumption, but openhearth material continues to move fairly well. Some of the buying apparently anticipates a higher market in the fall and there is an inclination to get as much on the ground as possible as an anchor against price flurries.

BOSTON—The noticeable lack of buying in chemical borings and the continued reports of over-the-formula buying in scrap highlight the market here. With prospective purchasers out of the market, it is difficult to quote a price for chemical borings. However, the figure \$36.00 to \$37.00 a ton was mentioned as the approximate price. In cast, the highly uncertain market still exists as foundry requirements appear well satisfied.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$40.00 to \$40.50
RR. hvy. melting.....	41.00 to 41.50
No. 2 hvy. melting.....	40.00 to 40.50
RR. scrap rails.....	55.50 to 56.50
Rails 2 ft and under.....	62.50 to 63.50
No. 1 comp'd bundles.....	40.00 to 40.50
Hand bld. new shts.....	40.00 to 40.50
Hvy. axle turn.....	41.50 to 42.00
Hvy. steel forge turn.....	41.50 to 42.00
Mach. shop turn.....	35.50 to 36.00
Shoveling turn.....	38.00 to 38.50
Mixed bor. and turn.....	35.50 to 36.00
Cast iron boring.....	38.00 to 38.50
No. 1 cupola cast.....	63.00 to 64.50
Hvy. breakable cast.....	52.00 to 53.00
Malleable.....	76.00 to 77.00
RR. knuck. and coup.....	55.50 to 56.50
RR. coil springs.....	55.50 to 56.50
RR. leaf springs.....	55.50 to 56.50
Roofed steel wheels.....	55.50 to 56.50
Low phos.	48.00 to 48.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$39.00 to \$39.50
No. 2 hvy. melting.....	39.00 to 39.50
No. 1 bundles.....	39.00 to 39.50
No. 2 dealers' bundles.....	39.00 to 39.50
Bundled mach. shop turn.....	37.00 to 37.50
Galv. bundles.....	35.00 to 35.50
Mach. shop turn.....	34.00 to 34.50
Short show turn.....	35.50 to 36.50
Cast iron borings.....	36.00 to 37.00
Mix. borings & turn.....	34.00 to 34.50
Low phos. hvy. forge.....	48.00 to 50.00
Low phos. plates.....	45.00 to 46.00
No. 1 RR. hvy. melt.....	41.25 to 41.75
Rerolling rails.....	54.00 to 55.00
Miscellaneous rails.....	52.00 to 52.50
Angles & splice bars.....	54.00 to 55.00
Locomotive tires, cut.....	53.00 to 55.00
Cut bolster & side frames.....	48.00 to 49.00
Standard stl. car axles.....	62.00 to 64.00
No. 3 steel wheels.....	52.00 to 53.00
Couplers & knuckles.....	53.50 to 54.00
Rails, 2 ft and under.....	56.00 to 57.00
Malleable.....	76.00 to 78.00
No. 1 mach. cast.....	69.00 to 70.00
No. 1 agricul. cast.....	60.00 to 63.00
Heavy breakable cast.....	55.00 to 60.00
RR. grate bars.....	62.00 to 65.00
Cast iron brake shoes.....	58.00 to 59.00
Cast iron carwheels.....	61.00 to 62.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$38.50 to \$39.50
No. 2 hvy. melting.....	38.50 to 39.50
No. 1 bundles.....	38.50 to 39.50
No. 2 bundles.....	38.50 to 39.50
Mach. shop turn.....	33.00 to 33.50
Shoveling turn.....	35.00 to 35.50
Cast iron borings.....	32.50 to 33.00
Mixed bor. & turn.....	32.50 to 33.00
Low phos. plate.....	46.00 to 48.00
No. 1 cupola cast.....	63.00 to 64.00
Hvy. breakable cast.....	53.00 to 54.00
Rails 18 in. & under.....	60.00 to 61.00
Rails random length.....	50.00 to 51.00
Drop broken.....	66.00 to 68.00

BOSTON

Dealers' buying prices, per gross ton, f.o.b. Boston

No. 1 hvy. melting.....	\$31.65 to \$31.90
No. 2 hvy. melting.....	31.65 to 31.90
Nos. 1 and 2 bundles.....	31.65 to 31.90
Busheling.....	31.65 to 31.90
Shoveling turn.....	28.90
Machine shop turn.....	26.90
Mixed bor. & turn.....	26.90
Cl'n cast chem. bor.....	36.00 to 37.00
No. 1 machinery cast.....	55.00 to 57.00
No. 2 machinery cast.....	54.00 to 56.00
Heavy breakable cast.....	53.00 to 53.50
Stove plate.....	51.50 to 52.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting.....	\$35.50
No. 2 hvy. melting.....	35.50
No. 1 bundles.....	35.50
New busheling.....	35.50
Flashings.....	35.90
Mach. shop turn.....	\$29.00 to 29.50
Shoveling turn.....	30.00 to 30.50
Cast iron borings.....	30.00 to 30.50
Mixed bor. & turn.....	28.50 to 29.00
Low phos. plate.....	39.50 to 40.50
No. 1 cupola cast.....	52.00 to 55.00
Heavy breakable cast.....	45.00 to 50.00
Stove plate.....	48.00 to 50.00
Automotive cast.....	52.00 to 55.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$42.00 to \$43.00
No. 2 hvy. melting.....	38.50 to 39.00
No. 1 bundles.....	42.00 to 43.00
No. 2 bundles.....	38.50 to 39.00
Mach. shop turn.....	34.50 to 35.00
Shoveling turn.....	34.50 to 35.00
Mixed bor. & turn.....	34.50 to 35.00
Clean cast chemical bor.....	42.00 to 44.00
No. 1 machinery cast.....	66.00 to 68.00
No. 1 mixed yard cast.....	62.00 to 63.00
Hvy. breakable cast.....	63.00 to 64.00
Clean auto cast.....	65.00 to 66.00
Hvy. axle forge turn.....	44.00 to 45.00
Low phos. plate.....	48.00 to 49.00
Low phos. punchings.....	48.00 to 49.00
Low phos. bundles.....	46.00 to 47.00
RR. steel wheels.....	52.00 to 53.00
RR. coil springs.....	52.00 to 53.00
RR. malleable.....	75.00 to 78.00
Cast iron carwheels.....	68.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$41.00 to \$42.00
No. 2 hvy. melting.....	37.50 to 38.50
Bundled sheets.....	37.50 to 38.50
Mach. shop turn.....	33.00 to 33.50
Locomotive tires, uncut.....	47.00 to 48.00
Mis. std. sec. rails.....	49.00 to 50.00
Steel angle cars.....	48.50 to 49.50
Rails 3 ft and under.....	53.00 to 55.00
RR. steel springs.....	49.00 to 50.00
Steel car axles.....	54.00 to 55.00
Grate bars.....	59.00 to 60.00
Brake shoes.....	57.00 to 58.00
Malleable.....	72.00 to 73.00
Cast iron car wheels.....	61.00 to 62.00
No. 1 machinery cast.....	65.00 to 67.00
Hvy. breakable cast.....	59.00 to 60.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$37.50
No. 2 hvy. melting.....	37.50
No. 2 bundles.....	37.50
No. 1 busheling.....	37.50
Long turnings.....	\$25.00 to 26.00
Shoveling turnings.....	27.00 to 28.00
Cast iron borings.....	26.00 to 27.00
Bar crops and plate.....	42.50 to 43.50
Structural and plate.....	42.50 to 43.50
No. 1 cupola cast.....	64.00 to 67.00
Stove plate.....	63.00 to 64.00
No. 1 RR. hvy. melt.....	38.50
Steel axles.....	51.00 to 52.00
Scrap rails.....	44.00 to 45.00
Rerolling rails.....	51.00 to 53.00
Angles & splice bars.....	51.00 to 53.00
Rails 3 ft & under.....	52.00 to 55.00
Cast iron carwheels.....	50.00 to 55.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$40.00 to \$40.50
No. 2 hvy. melting.....	40.00 to 40.50
Mach. shop turn.....	35.00 to 35.50
Short show. turn.....	37.00 to 37.50
Cast iron borings.....	36.00 to 36.50
Low phos.	45.00 to 45.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting.....	\$36.50 to \$37.50
No. 2 hvy. melting.....	34.50
No. 2 bundles.....	34.50
Mach. shop turn.....	29.00 to 29.50
Mixed bor. & turn.....	29.00 to 29.50
Shoveling turn.....	31.00 to 32.00
No. 1 cupola cast.....	55.50 to 56.50
Clean auto cast.....	55.50 to 56.50
Hvy. breakable cast.....	55.00 to 56.00
Charging box cast.....	55.00 to 56.00
Unstrp. motor blks.....	52.00 to 53.00
Cl'n cast chem. bor.....	34.50 to 35.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$39.75 to \$45.00
No. 2 hvy. melting.....	39.75
No. 1 bundles.....	39.75
No. 2 bundles.....	39.75
No. 1 busheling.....	39.75
Mach. shop turn.....	34.75 to 35.50
Shoveling turn.....	35.00 to 36.50
Cast iron borings.....	35.75
Mixed bor. & turn.....	34.75
No. 1 cupola cast.....	64.00 to 65.00
Mixed cupola cast.....	60.00 to 61.00
Charging box cast.....	56.00 to 57.00
Stove plate.....	60.00 to 61.00
Stove auto cast.....	60.00 to 61.00
RR. malleable.....	70.00 to 75.00
Small indl. malleable.....	47.00 to 49.00
Low phos. plate.....	44.75 to 46.00
Scrap rails.....	50.00 to 52.00
Rails 3 ft & under.....	57.00 to 59.00
RR. steel wheels.....	51.00 to 52.00
Cast iron carwheels.....	51.00 to 52.00
RR. coil & leaf spgs.....	51.00 to 52.00
RR. knuckles & coup.....	51.00 to 52.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting.....	\$39.50 to \$40.00
No. 2 hvy. melting.....	39.50 to 40.00
No. 1 bundles.....	39.50 to 40.00
No. 1 busheling.....	39.50 to 40.00
Drop forge flashings.....	39.50 to 40.00
Mach. shop turn.....	34.50 to 35.00
Shoveling turn.....	35.50 to 36.00
Steel axle turn.....	39.50 to 40.00
Cast iron borings.....	35.50 to 36.00
Mixed bor. & turn.....	35.50 to 36.00
Low phos.	44.50 to 45.00
No. 1 machinery cast.....	73.00 to 76.00
Malleable.....	74.00 to 76.00
RR. cast.....	73.00 to 74.00
Railroad grate bars.....	60.00 to 62.00
Stove plate.....	61.00 to 63.00
RR. hvy. melting.....	40.00 to 40.50
Rails 3 ft & under.....	60.00 to 61.00
Rails 18 in. & under.....	62.00 to 63.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting.....	\$25.00
No. 2 hvy. melting.....	25.00
No. 2 bales.....	25.00

Per gross ton delivered to consumer:

No. 3 bales.....	\$19.50
Mach. shop turn.....	16.00
Elec. furn. 1 ft under.....	\$32.00 to 34.00
No. 1 cupola cast.....	40.00 to 43.00
RR. hvy. melting.....	26.00

LOS ANGELES

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting.....	\$25.00
No. 2 hvy. melting.....	25.00
No. 1 bales.....	25.00
No. 2 bales.....	25.00
No. 3 bales.....	19.00
Mach. shop turn.....	17.50
No. 1 cupola cast.....	\$45.00 to 50.00
RR. hvy. melting.....	26.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.....	\$26.00
Elec. furn. 1 ft and under.....	30.00
No. 1 cupola cast.....	40.00
RR. hvy. melting.....	28.00

HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point.

Heavy melting.....	\$23.00*
No. 1 bundles.....	23.00*
No. 2 bundles.....	21.50*
Mechanical bundles.....	20.00*
Mixed steel scrap.....	19.00*
Mixed borings and turnings.....	17.00*
Rails, remelting.....	23.00*
Rails, rerolling.....	26.00*
Bushelings.....	17.00*
Bushelings, new fact, prep'd.....	21.00*
Bushelings, new fact, unprep'd.....	16.00*
Short steel turnings.....	17.00*
No. 1 cast.....	\$43.00 to 46.00
No. 2 cast.....	35.00 to 37.00

*Ceiling Price.

NONFERROUS METALS

... News and Market Activities

Brass Mills Fear Loss Of Metals To Priority

Waterbury

• • • News of the draft law establishment of priorities and allocations power over scarce materials burst like a bombshell over the brass mills who have had difficulty in obtaining their full requirements of copper, zinc, lead, tin and some other metals. The present squeeze on profit margins is such as to require mill operations to continue at present levels in order to remain solvent at current mill price spreads. Any action that would jeopardize their metals supplies beyond present tight positions would restrict operations and require an increase in mill prices.

The mills have been slugged with orders in the last three weeks by customers anxious to get them in before coming price increases which will be made necessary by wage agreements now pending. Negotiations with the unions are approaching agreement, as indicated by the news that the American Brass Co. and its union at Kenosha, Wisc. were in substantial agreement last week on the 8 pct increase offered, with only some fringe issues yet outstanding. Industry members believe that the pattern established by this agreement will govern developments at other plants, and it is expected that a lower offer by one mill will be raised to conform. One mill official was seriously considering the advisability of closing down operations if the unions rejected their offer.

• Price increases in mill products will be announced immediately after the wage agreements, as the present profit margin is said to be too narrow to permit any absorption of higher wage costs. So far, prices of phosphor bronze products have not been readjusted to reflect the increase in the price of tin that became effective the first of June. This increase will be made by producers after the wage agreements. Consumers who get their orders in before the effective dates of the new schedules will be protected under the industry's 60-day firm price policy.

The brass mills have been eating into their order backlogs for months, although operations are holding up well on a 2-shift basis. The current increase in volume is considered to be temporary, and a big question in the industry is whether the order volume will be maintained satisfactorily in the third and fourth quarters. A large part of the decline in orders is attributed to the drying up of dollar reserves abroad. So far, there is

Monthly Average Prices

• • • The average prices of the based on quotations appearing in major nonferrous metals in June THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	\$21.50
Lake copper, Conn. Valley..	21.625
Straits tin, New York.....	1.03
Zinc, East St. Louis.....	12.00
Zinc, New York	12.65
Lead, St. Louis	17.30
Lead New York	17.50

no evidence of any buying by ERP countries, nor has the rearmament program had any impact on requirements for mill products.

Industry members are in general agreement that price developments in the metals they use will be upward, principally due to the impact of foreign buying on the domestic market. This applies particularly to copper, zinc and lead. World prices for these metals are already above domestic prices and it is expected that this must exert its effect despite the firm resolve of some primary producers to hold down metal prices.

Lead

• • • Token strategic stockpiling of lead is underway to the extent of several thousand tons among all producers, according to an informed source. This is going on at a time when consumers are desperately short of lead and are required to buy metal on a large scale at 25.50¢ and 22.00¢ per lb. It is known that a carload of secondary lead was offered to a consumer at 24¢. These gray market prices for lead are bound to exert pressure on the domestic market and force up the price of major producers as they did once before. The suspension of the lead tariff now in effect until the end of June next year is expected in some quarters to result in an increase in the lead buying and selling prices of the British Ministry of Supply. This will be necessary to permit the British to be competitive in the world concentrates market. This action might well be the critical development to bring about a domestic price increase. Smelters have reduced the smelting charge for battery lead to \$15 a ton due to a competitive situation in which a Philadelphia smelter is buying in New York.

Zinc

• • • All grades of zinc are in short supply, but it is understood that the government is no longer actively stockpiling the metal. Brass mills are urgently in need of the higher grades of zinc they require for present operations. They have been seriously affected by the newly established government policy of not selling war surplus shell casings which are now being withheld for an emergency stockpile. Therefore their zinc and copper requirements are somewhat higher now.

Nonferrous Metals Prices

	June 23	June 24	June 25	June 26	June 28	June 29
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03
Zinc, East St. Louis	12.00	12.00	12.00	12.00	12.00	12.00
Lead, St. Louis	17.30	17.30	17.30	17.30	17.30	17.30

Primary Metals

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, 10,000 lb. f.o.b. shipping point, freight allowed....	16.00
Aluminum pig, f.o.b. shipping point	15.00
Antimony, American, Laredo, Tex....	35.00
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be.....	\$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be.....	\$40.00
Cadmium, del'd	\$1.75
Cobalt, 97-99% (per lb).....	\$1.65 to \$1.72
Copper electro, Conn. Valley.....	21.60
Copper, lake, Conn. Valley.....	21.625
Gold, U. S. Treas, dollars per oz....	\$35.00
Indium, 99.8%, dollars per troy oz....	\$2.25
Iridium, dollars per troy oz.....	\$110 to \$120
Lead, St. Louis	17.30
Lead, New York	17.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots.....	84.50
Mercury, dollars per 76-lb flask, f.o.b. New York.....	\$75 to \$77
Nickel, electro, f.o.b. New York....	36.56
Palladium, dollars per troy oz.....	\$24.00
Platinum, dollars per troy oz.....	\$75 to \$78
Silver, New York, cents per oz.....	74.625
Tin, Grade A, New York.....	\$1.03
Zinc, East St. Louis.....	12.00
Zinc, New York	12.65
Zirconium copper, 20 pct Zr, per lb contained Zr.	\$8.75

Remelted Metals

B-ss Ingot

(Cents per lb. in carloads)

85-5-5-5 ingot	
No. 115	19.50-20.00
No. 120	19.00-19.50
No. 123	18.50-19.00
80-10-10 ingot	
No. 305	25.25
No. 315	22.25
88-10-2 ingot	
No. 210	31.00
No. 215	29.00
No. 245	23.25-23.75
Yellow ingot	
No. 405	16.25-16.00
Manganese bronze	
No. 421	19.00

Aluminum Ingot

(Cents per lb. lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	22.00-22.50
0.60 copper, max.	22.00
Piston alloys (No. 122 type)...	20.00
No. 12 alum, (No. 2 grade)....	20.00
108 alloy	20.50
195 alloy	20.25
13 alloy	22.00
AXS-679	20.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1-95 pct.-95½ pct.....	20.75-21.00
Grade 2-92 pct.-95 pct.....	19.75-20.50
Grade 3-90 pct.-92 pct.....	19.50-20.00
Grade 4-85 pct.-90 pct.....	19.25-19.75

Electroplating Supplies

Anodes

(Cents per lb. f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer.....	37½
Electrodeposited	32½
Rollad, oval, straight, delivered....	33.09
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer.....	33½
Zinc, cast, 99.99	20.50
Nickel 99 pct plus, frt. allowed	
Cast	51
Rollad, depolarized	52
Silver 999 fine	
Rollad, 1000 oz lots per troy oz....	67½

Chemicals

(Cents per lb. f.o.b. shipping point)

Copper cyanide, 100 lb drum.....	44.00
Copper sulfate, 99.5, crystals, bbls..	12.50
Nickel salts, single, 425 lb bbls. frt. allowed	15.50
Silver cyanide, 100 oz. lots, per oz. 54.00	
Sodium cyanide, 96 pct domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums.....	35.00
Zinc sulfate, 89 pct, granules, bbls, frt. allowed	7.90

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb., f.o.b. shipping point, freight allowed.)

Flat Sheet: 0.188 in., 2S, 3S, 24; 4S, 61S-O, 25.8¢; 52S, 27.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢. 0.081 in.; 2S, 3S, 25¢; 4S, 61S-O, 27.1¢; 52S, 29¢; 24S-O, 24S-OAL, 27.7¢; 75S-O, 75S-OAL, 34.3¢. 0.032 in.; 2S, 3S, 26.4¢; 4S, 61S-O, 30.1¢; 52S, 32.6¢; 24S-O, 24S-OAL, 34.2¢; 75S-O, 75S-OAL, 43.1¢.
Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 4S-F, 23.2¢; 52S, 24.2¢; 61S-O, 23.8¢; 24S-F, 24S-FAL, 24.2¢; 75S, 75S-AL, 30.5¢.

Extruded Solid Shapes: Shape factors 1 to 4; 81¢ to 59¢; 11 to 13, 81.9¢ to 69¢; 23 to 25, 83.4¢ to 90¢; 35 to 37, 40.8¢ to \$1.25; 47 to 49, 58.7¢ to \$1.84.

Extruded Round Rod, Square, Hex, Octagonal Bar: ¼ in. and over, 27¢ to 38¢; ½ to ¾ in., 28¢ to 40.5¢; ¾ to 1 in., 29¢ to 48¢; 1 to 1½ in., 30¢ to 46.5¢; 1½ to 2 in., 32.5¢ to 53.5¢; 2 to 2½ in., 35.5¢ to 62¢.

Rollad Rod: 1.064 to 4.5 in., 2S, 3S, 30¢ to 26.5¢; Cold-finished rod, 0.375 to 3.5 in., 2S, 3S, 32¢ to 28¢.

Screw Machine Stock: Drawn, ½ to 1½ in., 11S-T3, R317-T4, 45¢ to 34¢; cold-finished, ¾ to 1½ in., 11S-T3, 33¢ to 31¢; ¾ to 2 in., R317-T4, 33¢ to 30¢; rolled, 1½ to 3 in., 11S-T3, 31¢ to 28.5¢; 2½ to 3½ in., R317-T4, 29.5¢ to 28.5¢. Base 5000 lb.

Drawn Wire: coiled, 0.051 to 0.374 in.; 2S, 33¢ to 24¢ 52S, 40.5¢ to 29¢; 56S, 42.5¢ to 34.5¢; 17S-T4, 46¢ to 31¢; 61S-T4, 41¢ to 30.5¢; 75S-T6, 66¢ to 46¢.

Magnesium

(Cents per lb. f.o.b. mill, freight allowed. Base quantity 30,000 lb.)

Sheet and Plate: M.A. FSA. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢ 20, 96¢-101¢; 22, \$1.22-\$1.31; 24, \$1.62-\$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1 to 1.749, 43¢; 2 to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 1, 74¢, 48¢; 1½ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 1.00 to 0.11 lb. per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.057, ¼ to ¾ \$1.14; ¾ to 1, \$1.02; 1 to 1½, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ¾ to 1, 85¢; ¾ to 1, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ¾ to 1, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb. f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	41	
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	33	71
Shot and blocks		31

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	33.53	...	33.68
Copper, hot-rolled	30.03	...	...
Copper, drawn	31.03	...	...
Low brass	34.3¢	31.39	31.70
Yellow brass	32.92*	29.85	30.16
Red brass	34.89*	31.92	32.23
Naval brass	30.28	29.03	34.97
Leadad brass	28.64	24.69	...
Commercial			
bronze	35.68*	32.96	33.27
Manganese bronze	33.87	32.37	38.47
Phosphor bronze, 5 pct	53.95*	52.95	52.70
Muntz metal	29.80	28.55	32.99
Everdur, Herculoxy, Olympic, etc. ..	37.24	37.50	38.56
Nickel silver, 10 pct.	41.80	42.63	40.54
5 pct	...	...	38.98
Architectural			
bronze	28.61	...	...
*Seamless tubing.			

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1¢ per lb for shipments of 15,000 lb or more.)

	Heavy	Turn-ings
Copper	19½	18½
Yellow brass	15½	14½
Red brass	17½	16½
Commercial bronze	17½	16½
Manganese bronze	15½	14½
Leadad brass rod ends.....	15½	...

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper, wire.....	18.50
No. 2 copper, wire.....	17.50
Light copper	16.50
Refinery brass	16.50-16.75*

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire.....	18.50
No. 2 copper, wire.....	17.50
Light copper	16.50
No. 1 composition.....	14.50
No. 1 comp. turnings.....	14.00
Rollad brass	11.00
Brass pipe	11.25
Radiators	12.00
Heavy yellow brass.....	10.50

Aluminum

Mixed old cast.....	11.50
Mixed old clips.....	11.50
Mixed turnings, dry	11.00
Pots & pans	12.00
Low copper	12.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Copper and Brass

No. 1 heavy copper and wire...	16½-17½
No. 2 heavy copper and wire..	15½-16½
Light copper	14½-15
Auto radiators (unsweated)...	10-10½
No. 1 composition	12½-13½
No. 1 composition turnings....	12½-12¾
Clean red car boxes.....	9¾-10
Cocks and faucets.....	9¾-10½
Mixed heavy yellow brass....	8¾-8¾
Old rolled brass	9¾-10
Brass pipe	10½-10½
New soft brass clippings.....	12½-12¾
Brass rod ends	10-10½
No. 1 brass rod turnings.....	9½-10

Aluminum

Alum. pistons and struts.....	7-7½
Aluminum crankcases	9½-10
2S aluminum clippings	11-11½
Old sheet & utensils	9½-10
Dry borings and turnings....	4-4½
Misc. cast aluminum	9½-10
Dural clips (24S).....	9½-10

Zinc

New zinc clippings	8-8½
Old zinc	6-6½
Zinc routings	3-3½
Old die cast scrap.....	4-4½

Nickel and Monel

Pure nickel clippings	17-18
Clean nickel turnings	13-14
Nickel anodes	17-18
Nickel rod ends	17-18
New Monel clippings	12-13
Clean Monel turnings	8-9
Old sheet Monel	10-10½
Old Monel castings	7½-8
Inconel clippings	9-10
Nickel silver clippings, mixed	8-8½
Nickel silver turnings, mixed	6½-7

Lead

Soft scrap lead	15½-16
Battery plates (dry)	10-10½

Magnesium Alloys

Segregated solids	8-9
Castings	4½-5½

Miscellaneous

Block tin	81-83
No. 1 pewter	65-67
No. 1 auto babbitt	50-52
Mixed common babbitt	14½-14¾
Solder joints	19-19½
Siphon tops	50-52
Small foundry type	17½-18
Monotype	16½-16¾
Lino. and stereotype	15½-16
Electrotype	13½-14
New type shell cuttings.....	14½-15
Hand picked type shells.....	6½-7
Lino and stereo dross.....	8-8½
Electro dross	6-6½

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major basing points: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	June 29, 1948	June 22, 1948	June 1, 1948	July 1, 1947
(cents per pound)	1948	1948	1948	1947
Hot-rolled sheets	2.775	2.775	2.775	2.50
Cold-rolled sheets	3.495	3.495	3.495	3.20
Galvanized sheets (10 ga.)	3.913	3.913	3.913	3.55
Hot-rolled strip	2.775	2.775	2.775	2.50
Cold-rolled strip	3.535	3.535	3.535	3.20
Plates	2.93	2.93	2.93	2.65
Plates wrought iron	7.25	7.25	7.25	5.95
Stain's c-r strip (No. 302)	30.50	30.50	30.50	30.50

Tin and Terneplate:	June 29, 1948	June 22, 1948	June 1, 1948	July 1, 1947
(dollars per base box)				
Tinplate (1.50 lb) cokes..	\$6.70	\$6.70	\$6.70	\$5.75
Tinplate, electro (0.50 lb)	5.90	5.90	5.90	5.05
Special coated mfg. ternes	5.80	5.80	5.80	4.90

Bars and Shapes:	June 29, 1948	June 22, 1948	June 1, 1948	July 1, 1947
(cents per pound)				
Merchant bars	2.875	2.875	2.875	2.60
Cold-finished bars	3.483	3.483	3.483	3.20
Alloy bars	3.213	3.213	3.213	3.05
Structural shapes	2.767	2.767	2.767	2.50
Stainless bars (No. 302)	26.00	26.00	26.00	26.00
Wrought iron bars	8.65	8.65	8.65	6.15

Wire:	June 29, 1948	June 22, 1948	June 1, 1948	July 1, 1947
(cents per pound)				
Bright wire	3.608	3.608	3.608	3.30

Rails:	June 29, 1948	June 22, 1948	June 1, 1948	July 1, 1947
(dollars per 100 lb)				
Heavy rails	\$2.725	\$2.725	\$2.725	\$2.50
Light rails	3.05	3.05	3.05	2.85

Semifinished Steel:	June 29, 1948	June 22, 1948	June 1, 1948	July 1, 1947
(dollars per gross ton)				
Rerolling billets	\$45.00†	\$45.00†	\$45.00†	\$42.00
Slabs, rerolling	45.00†	45.00†	45.00†	42.00
Forging billets	54.00†	54.00†	54.00†	50.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	61.00

Wire Rods and Skelp:	June 29, 1948	June 22, 1948	June 1, 1948	July 1, 1947
(cents per pound)				
Wire rods	3.133	3.133	3.133	2.55
Skelp	2.888	2.888	2.888	2.35
† Net ton				

Pig Iron:	June 29, 1948	June 22, 1948	June 1, 1948	July 1, 1947
(per gross ton)	1948	1948	1948	1947
No. 2, foundry, Phila...	\$44.85	\$44.85	\$44.85	\$36.51
No. 2, Valley furnace...	39.50	39.50	39.50	33.50
No. 2, Southern Cin'ti...	45.47	45.47	45.47	34.75
No. 2, Birmingham...	39.38	39.38	39.38	29.88
No. 2, foundry, Chicago†	39.00	39.00	39.00	33.00
Basic del'd Philadelphia..	44.35	44.35	44.35	36.92
Basic, Valley furnace...	39.00	39.00	39.00	33.00
Malleable, Chicago†	39.50	39.50	39.50	33.50
Malleable, Valley	39.50	39.50	39.50	33.50
Charcoal, Chicago	65.55	65.55	65.55	45.99
Ferromanganese†	145.00	145.00	145.00	135.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.
‡ For carlots at seaboard.
* Revised.

Scrap:	June 29, 1948	June 22, 1948	June 1, 1948	July 1, 1947
(per gross ton)				
Heavy melt'g steel, P'gh..	\$40.25	\$40.25	\$40.25	\$35.75
Heavy mlt'g steel, Phila.	42.50	42.50	42.50	37.25
Heavy melt'g steel, Ch'go	39.25	39.25	39.25	33.75
No. 1, hy, comp. sh't, Det.	35.50	35.50	35.50	33.25
Low phos. Young'n...	45.25	45.25	45.25	38.75
No. 1, cast, Pittsburgh...	63.75	63.75	64.00	36.50
No. 1, cast, Philadelphia.	67.00	67.00	67.00	46.50
No. 1, cast, Chicago.....	69.50	69.50	71.50	44.00

Coke, Connellsville:	June 29, 1948	June 22, 1948	June 1, 1948	July 1, 1947
(per net ton at oven)				
Furnace coke, prompt...	\$12.75	\$12.75	\$12.50	\$10.50
Foundry coke, prompt...	16.50	16.50	14.00	11.25

Nonferrous Metals:	June 29, 1948	June 22, 1948	June 1, 1948	July 1, 1947
(cents per pound to large buyers)				
Copper, electro. Conn...	21.50	21.50	21.50	21.50
Copper, Lake Conn.	21.625	21.625	21.625	21.625
Tin, Grade A, New York.	\$1.03	\$1.03	\$1.03	80.00
Zinc, East St. Louis....	12.00	12.00	12.00	10.50
Lead, St. Louis.....	17.30	17.30	17.30	14.80
Aluminum, virgin	16.00	15.00	15.00	15.00
Nickel, electrolytic	36.56	36.56	36.56	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex..	35.00	35.00	35.00	33.00

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL (Base Price)				PIG IRON				SCRAP STEEL			
June 29, 1948.....	3.24473¢	per lb.....		\$40.53	per gross ton....	\$40.66	per gross ton.....	\$40.66	per gross ton.....	\$40.66	per gross ton.....
One week ago.....	3.24473¢	per lb.....		\$40.53	per gross ton....	\$40.66	per gross ton.....	\$40.66	per gross ton.....	\$40.66	per gross ton.....
One month ago.....	3.24473¢	per lb.....		\$40.53	per gross ton....	\$40.66	per gross ton.....	\$40.66	per gross ton.....	\$40.66	per gross ton.....
One year ago.....	2.85664¢	per lb.....		\$33.15	per gross ton....	\$35.58	per gross ton.....	\$35.58	per gross ton.....	\$35.58	per gross ton.....
HIGH				HIGH				HIGH			
1948....	3.27585¢	Feb. 17	3.22566¢	Jan. 1	\$40.53	May 18	\$39.58	Jan. 6	\$41.83	Jan. 29	\$39.75
1947....	3.19541¢	Oct. 7	2.87118¢	Jan. 7	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50
1946....	2.83599¢	Dec. 31	2.54490¢	Jan. 1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17
1945....	2.44104¢	Oct. 2	2.38444¢	Jan. 2	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	18.92
1944....	2.30837¢	Sept. 5	2.21189¢	Oct. 5	\$23.61		\$23.61		19.17	Jan. 11	15.76
1943....	2.29176¢		2.29176¢		23.61		23.61		\$19.17		\$19.17
1942....	2.28249¢		2.28249¢		23.61		23.61		19.17		19.17
1941....	2.43078¢		2.43078¢		\$23.61	Mar. 20	\$23.45	Jan. 2	\$22.00	Jan. 7	\$19.17
1940....	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04
1939....	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08
1938....	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00
1937....	2.58414¢	Mar. 9	2.32263¢	Jan. 4	23.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67
1936....	2.32263¢	Dec. 28	2.05200¢	Mar.10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67
1935....	2.07642¢	Oct. 1	2.06492¢	Jan. 8	18.84	Nov. 5	17.83	May 14	13.42	Dec. 10	10.33
1934....	2.15367¢	Apr. 24	1.95757¢	Jan. 2	17.90	May 1	16.90	Jan. 27	13.00	Mar. 13	9.50
1933....	1.95578¢	Oct. 3	1.75836¢	May 2	16.90	Dec. 5	13.56	Jan. 3	12.25	Aug. 8	6.75
1932....	1.89196¢	July 5	1.83901¢	Mar. 1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12	6.43
1931....	1.99626¢	Jan. 13	1.86586¢	Dec. 29	15.90	Jan. 6	14.79	Dec. 15	11.33	Jan. 6	8.50
1930....	2.25488¢	Jan. 7	1.97319¢	Dec. 9	18.21	Jan. 7	15.90	Dec. 16	15.00	Feb. 18	11.25
1929....	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound unless otherwise indicated. Extras apply. Delivered prices are minimum and do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb & over. (9) Carload lot in manufacturing trade. (10) Arbitrary delivered prices. (11) Hollowware enameling, gages 29 to 31 only. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only. (14) Kaiser Co. prices (15) from 0.035 to 0.075 in. thick by $\frac{1}{4}$ to $3\frac{1}{2}$ in. wide. (16) Delivered Los Angeles; add 0.55¢ per 100 lb for San Francisco. (17) Slab prices subject to negotiation in most cases. (18) 24 to 14 gage, up to 48 in.; 26 gage, up to 42 in.; 30 to 27 gage, up to 36 in.

PRODUCTS	Prices at basing points apply only to the sizes and grades produced at those points.												DELIVERED TO			
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio		San Francisco, Los Angeles	Detroit ¹⁰	New York	Phila- delphia	
INGOTS Carbon forging	\$46.00	Rerolling ingots—\$36.00 per net ton f.o.b. mill (Spot market as \$75 to \$90 per gross ton)														
Alloy	\$56.00										Canton = \$56.00					
BILLETS, BLOOMS, SLABS Carbon, rerolling ¹⁷	\$46.00	\$45.00	\$45.00	\$47.00	\$45.00	\$45.00		\$45.00								
Carbon forging billets	\$54.00	\$54.00	\$54.00	\$54.00	\$54.00	\$54.00	(per net ton)									
Alloy	\$66.00	\$68.00					(Bethlehem, Massillon, Canton = \$66. 0)									
PIPE SKELP	2.85 to 2.90						2.90									
WIRE RODS	2.80 to 3.55	2.80 to 3.80		2.80 to 3.05	2.85						Worcester = 2.90	3.5245 ¹³				
SHEETS Hot-rolled ⁶	2.75 to 2.80	2.75 to 2.80	2.75	2.80	2.75 to 2.80	2.80	2.75 to 2.80	2.80			Ashland, Ky. = 2.80	3.494 ¹⁸ to 3.6875	2.96 to 3.01	3.18 to 3.31	3.06 to 3.24	
Cold-rolled ¹	3.45 to 3.50	3.45 to 3.55	3.45	3.50		3.55	3.55	3.55 ¹⁸	3.65	3.50			3.66	3.93 to 4.01	3.81 to 3.94	
Galvanized (10 gage)	3.85	3.95	3.85 to 3.95		3.85 to 3.95		3.95	3.95	4.0	3.95	Ashland = 3.95	4.624 ¹⁶		4.33	4.21	
Enameling (12 gage)	3.85	3.75	3.75 to 3.85	3.95			3.95		4.05	3.85			4.11 to 4.16	4.41	4.34	
Long tennes ² (10 gage)	4.05		4.05											4.61	4.54	
STRIP Hot-rolled ³	2.80	2.75 to 2.80	2.75	2.75 to 2.80	2.75		2.75 to 2.80					3.554 ¹⁸ to 3.9125	2.96 to 3.01	3.36	3.29	
Cold-rolled ⁴	3.50	3.75 to 3.65	3.55	3.45 to 3.50			3.55				Worcester = 3.65 to 3.75		3.66	4.05	3.99	
TINPLATE Cokes, 1.50 lb, base box	6.70	6.70	6.70		6.80			6.80	6.90		(Warren, Ohio = \$6.80)			7.18	7.06	
Electrolytic ⁷ 0.25, 0.50, 0.75 lb, box	Deduct \$1.00, 80¢ and 60¢ respectively from 1.50 lb coke base box price.															
TERNES, MFG., special coated	Deduct 90¢ from 1.50 lb coke base box price.															
BLACKPLATE, CANMAKING 55-70 lb, 75-95 lb, 100-125 lb	Deduct \$1.60, \$1.70 and \$1.60 respectively from 1.50 lb coke base box price.															
BLACKPLATE, h.c., 29 ga. ¹¹	4.65	4.65	4.65					4.75	4.85					5.13	5.01	
BARS Carbon Steel	2.85 to 2.90	2.80 to 2.90	2.85	2.90	2.85 to 2.90	2.90	2.85 to 2.90					3.579 ¹⁴ to 3.629 ¹⁴	3.06 to 3.11	3.40	3.34	
Reinforcing (billet) ¹	2.70 to 2.80	2.70 to 2.80	2.70		2.70		2.70	2.75				3.325 ¹⁴		3.13	3.01	
Cold-finished ¹	3.45 to 3.55	3.45 to 3.55		3.45									3.60 to 3.76	4.01	3.94	
Alloy, hot-rolled	3.20	3.20 to 3.30	3.20			3.30	3.20	Bethlehem, Massillon, Canton = 3.30						3.56	3.48	
Alloy, cold-drawn	4.00 to 4.10	4.00 to 4.10		4.00		4.10		Massillon, Canton = 4.10						4.56	4.49	
PLATE Carbon steel ¹²	2.90 to 2.95	2.90 to 2.95	2.90 to 2.95	2.95	2.85 to 2.90		2.90 to 2.95	Coatesville = 3.45, Claymont = 3.65 .95 Geneva, Utah = 2.90				3.8375 ¹⁴		3.33	3.21	
Floor plates	4.05	3.95 to 4.05	3.95	4.05										4.61	4.54	
Alloy	3.70	3.70	3.70							Coatesville = 4.80				4.28	4.19	
SHAPES, Structural	2.75	2.75 to 2.80	2.75 to 2.80		2.75			Bethlehem = 2.80, Geneva, Utah = 2.75				3.424 ¹⁸ to 3.49		3.06	2.98	
MANUFACTURERS' WIRE ⁸ Bright	3.45 to 3.80	3.45 to 4.05		3.45	3.45 to 3.55					Worcester = 3.65 Duluth = 3.50	4.4645 ¹³		3.95	3.94		
Spring (high carbon)	4.50	4.60		4.50						Worcester = 4.60 Trenton, Duluth = 4.75	5.5345 ¹³		5.00	4.99		
PILING, Steel sheet	3.30	3.30				3.30								3.83	3.79	

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville, Beth, Brackenridge.....	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville, Beth, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet, Beth, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton, Brackenridge, Balt, Coatesville.....	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt, Brackenridge.....	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown.....	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Jersey City, Reading, Canton, Youngstown, Balt, W. Leechburg.....	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne, Brackenridge.....	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton, W. Leechburg.....	32.46	30.30	23.80	24.34	34.82	56.26
Rod, h-r, Syracuse.....	27.05	25.97	20.02	20.56	24.34	28.75
Tubing, seamless, P'gh, Chi, Canton, Brackenridge, Milwaukee.....	72.09	72.09	.....	68.49	.....	.....

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	14.00¢
8 to 16	48, 60, 72	14.50¢
7	48, 60	15.75¢
6	48, 60	17.00¢
4, 5	40	17.50¢
3	40	18.50¢
2½	24, 30	19.00¢
2	24, 30	21.00¢
Carbon		
40	100, 110	6.75¢
35	65, 110	6.75¢
30	65, 84, 110	6.75¢
24	72 to 104	6.75¢
17 to 20	84, 90	6.75¢
14	60, 72	7.25¢
10, 12	60	7.50¢
8	60	7.75¢

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	82¢
18	4	1	—	5	\$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢
High-carbon-chromium*					47¢
Oil hardening manganese*					26¢
Special carbon*					24¢
Extra carbon*					20¢
Regular carbon*					17¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Armature	4.70¢ to 5.05¢
Electrical	5.20¢ to 5.45¢
Motor	5.95¢ to 6.30¢
Dynamo	6.65¢ to 7.50¢
Transformer 72	7.15¢ to 8.25¢
Transformer 65	7.85¢ to 9.20¢
Transformer 58	8.55¢ to 9.90¢
Transformer 52	9.35¢ to 9.70¢

F.o.b. Chicago and Gary; armature through motor only. F.o.b. Granite City add to lower quotation 0.55¢ for armature through and including 72, and 0.45¢ for balance.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, 100 lb and heavier, No. 1 O.H., per 100 lb.....\$2.70 to \$2.75*
Joint bars, 100 lb..... 3.75
Light rails (from billets) per 100 lb. 3.05

* CF&I charges \$3.05.

	Base per lb
Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	8.55¢
Tie plates, Pittsburg, Calif.....	8.70¢
Track bolts	7.00¢
Track bolts, heat treated, to railroads	7.25¢

C-R SPRING STEEL

Base per pound f.o.b. Pittsburgh, Cleveland

0.08 to 0.40 carbon.....	3.45¢
0.41 to 0.60 carbon.....	4.95¢
0.61 to 0.80 carbon.....	5.55¢
0.81 to 1.05 carbon.....	7.05¢
1.06 to 1.35 carbon.....	9.35¢
Worcester, add 0.20¢	

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Fa.....	*24.00	*22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.....	21.50	...
Inconel-clad		
10 pct, f.o.b. Coatesville..	30.00	...
Monel-clad		
10 pct, f.o.b. Coatesville..	24.00	...
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	9.00	...

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Birmingham

	Base Columns	San Francisco
Standard & coated nails*	91	112
Galvanized nails.....	91	112
Woven wire fence.....	97	120
Fence posts, carloadstt..	104	...
Single loop bale ties....	118	...
Galvanized barbed wire**	94	131
Twisted barbed wire..	111	...

* Also Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80-rod spools, in carloads. †† Duluth only.

	Base per 100 lb	San Francisco
Annealed fence wire†...\$4.10		\$5.1145
Annealed, galv. fencing† 4.55		5.5645
Cut nails, carloadstt.... 6.15		...

† Add 10¢ at Worcester. †† Wheeling only, Pittsburgh add 15¢ (less 20¢ to jobbers).

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Oilcoley	Yoloy	NAX High Tensile
Producer	Repub-lic	Carnegie-Illinois, Republic	Repub-lic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates.....	4.55	4.45	4.55	4.55	4.45	4.55	4.45	4.55	4.55
Sheets									
Hot-rolled...	4.30	4.20	4.30	4.50	4.20	4.30	4.20	4.30	4.30
Cold-rolled...	5.30	5.20	5.30	...	5.20	5.30	5.20	5.30	5.30
Galvanized...	...	5.90	...	...	5.90	6.00	...	...	...
Strip									
Hot-rolled...	4.70	4.20	4.30	...	4.20	4.30	4.20	4.30	4.30
Cold-rolled...	...	...	5.30	...	...	5.30	5.30	5.30	5.30†
Shapes.....	...	4.20	...	...	4.20	4.30	4.20	4.30	...
Beams.....	...	4.20	...	...	4.20	4.30	...	...	...
Bars									
Hot-rolled...	4.45	4.35	4.45	...	4.35	4.45	4.35	4.45	4.45
Bar shapes.....	...	4.35	...	...	4.35	4.45	4.35	4.45	...

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh and Lorain, steel butt weld and seamless.

Others f.o.b. Pittsburgh only

Base price, \$200.00 per net ton

One producer allows 1 point less discount on steel butt weld.

Standard, threaded & coupled

Steel, butt weld	Black	Galv.
1/2-in.	48	30 1/4
3/4-in.	51	34 1/4
1-in.	53 1/4	37 1/4
1 1/4-in.	54	38
1 1/2-in.	54 1/4	38 1/4
2-in.	55	39
2 1/2 and 3-in.	55 1/4	39 1/4
Wrought iron, butt weld		
1/2-in.	+11	+35
3/4-in.	+1 1/2	+25
1 and 1 1/4-in.	4	+16 1/2
1 1/2-in.	9 1/2	+13
2-in.	10	+12 1/2
Steel, lap weld		
2-in.	44 1/4	28
2 1/2 and 3-in.	48 1/4	32
3 1/2 to 6-in.	50 1/4	34
Steel, seamless		
2-in.	43 1/4	27
2 1/2 and 3-in.	46 1/4	30
3 1/2 to 6-in.	48 1/4	32
Wrought iron, lap weld		
2-in.	1 1/4	+20
2 1/2 to 3 1/4-in.	4	+16
4-in.	8	+10 1/2
4 1/2 to 8-in.	6	+12

Extra Strong, plain ends

Steel, butt weld		
1/2-in.	46	30
3/4-in.	50	34
1-in.	52	37
1 1/4-in.	52 1/4	37 1/4
1 1/2-in.	53	38
2-in.	53 1/4	38 1/4
2 1/2 and 3-in.	54	39
Wrought iron, butt weld		
1/2-in.	+6 1/4	+29
3/4-in.	+1 1/2	+23
1 and 1 1/4-in.	4	+16 1/2
1 1/2-in.	10	+12 1/2
Steel, lap weld		
2-in.	43 1/4	28
2 1/2 and 3-in.	48 1/4	32
3 1/2 to 6-in.	52	36 1/4
Steel, seamless		
2-in.	42 1/4	27
2 1/2 and 3-in.	46 1/4	31
3 1/2 to 6-in.	50	34 1/4
Wrought iron, lap weld		
2-in.	4 1/4	+16 1/4
2 1/2 to 4-in.	13	+6
4 1/2 to 6-in.	8	+10 1/4

Basing discounts for standard pipe are for threads and couplings. For threads only, butt weld, lap weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt weld, lap weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap weld and seamless 3 1/4-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all butt weld. On butt weld and lap weld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft. inclusive.

OD	Gage	Hot- Rolled	Cold- Drawn	Electric Weld Hot- Rolled	Cold- Drawn
1 1/2 in.	13	\$17.84	\$20.99	\$17.30	\$20.36
2 1/2	13	23.99	28.21	23.27	27.36
3	13	26.63	31.40	25.88	30.46
3 1/2	11	33.35	39.26	32.35	38.08
4	10	41.40	48.70	40.16	47.24

* One company charges approx. 2 pct less.

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago	\$98.70
6-in. to 24-in., del'd New York	95.50
6-in. to 24-in., Birmingham	85.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	112.30
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Percent Off List
1/2 in. & smaller x 6 in. & shorter	45
9/16 & 1 in. x 6 in. & shorter	46
1 1/4 in. & larger x 6 in. & shorter	43
All diam, longer than 6 in.	41
Lag, all diam over 6 in. long	44
Lag, all diam x 6 in. & shorter	46
Plow bolts	54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)	
1/2 in. and smaller	43
9/16 to 1 in. inclusive	42
1 1/4 to 1 1/2 in. inclusive	40
1 1/2 in. and larger	35
On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.	

Semifin. Hexagon Nuts USS SAE

	USS	SAE
7/16 in. and smaller	46	46
1/2 in. and smaller	44	44
1/2 in. through 1 in.	44	44
9/16 in. through 1 in.	43	43
1 1/4 in. through 1 1/2 in.	41	42
1 1/2 in. and larger	35	35

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate	65 and 10
In bulk	75
On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.	

Large Rivets (1/2 in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$5.65
F.o.b. Lebanon, Pa.	5.80

Small Rivets (7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55

Cap and Set Screws

	Percent Off List
(In packages)	
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	53
1/2 to 1 in. x 6 in., SAE 1035, heat treated	44
Set screws, oval points	57
Milled studs	29
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	37
Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.	

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF ₂ Content:	Base price per short ton
70% or more	\$35.00
65% but less than 70%	34.00
60% but less than 65%	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, Bessemer	\$6.60
Old range, non-Bessemer	6.45
Mesabi, Bessemer	6.35
Mesabi, non-Bessemer	6.20
Old phosphoric	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDER

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 93+%	
Fe	9.5¢ to 16.0¢
Electrolytic iron, annealed, 99.5+%	19.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+%	44.0¢
Hydrogen reduced iron, minus 300 mesh, 98+%	63.0¢ to 80.0¢
Carbonyl iron, minus 300 mesh, 98%, 99.8+%	90.0¢ to \$1.75
Aluminum	23.0¢
Antimony	46.0¢
Brass	24.0¢ to 28.5¢
Copper, electrolytic	30.625¢
Copper, reduced	30.5¢
Cadmium	\$2.40
Chromium, electrolytic, 99% min.	\$3.50
Lead	24.0¢
Manganese	50.0¢
Molybdenum, 99%	\$3.65
Nickel, unannealed	51.5¢
Nickel, spherical, minus 30 mesh	53.0¢
Silicon	29.0¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 802	75.0¢
Tin	\$1.11
Tungsten, 98%, 99%	\$2.90

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$12.00 to \$13.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	16.00 to 17.00
Foundry, Byproduct	
Chicago, del'd	\$18.60
Chicago, f.o.b.	17.50
Detroit, f.o.b.	18.50
New England, del'd	21.75
Seaboard, N. J., f.o.b.	20.50
Philadelphia, f.o.b.	19.50
Swedeland, Pa., f.o.b.	19.50
Ashland, Ohio, f.o.b.	18.25
Painesville, Ohio, f.o.b.	19.45
Erie, del'd	19.95
Cleveland, del'd	17.90
Cincinnati, del'd	18.69
St. Louis, del'd	18.03
Birmingham, del'd	16.71

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
No. 1 Ohio	\$67.00
First quality, Pa., Md., Ky., Mo., Ohio	
First quality, New Jersey	73.00
Sec. quality, Pa., Md., Ky., Mo., Ohio	78.00
Sec. quality, New Jersey	67.00
No. 2 Ohio	59.00
Ground fire clay, net ton, bulk	10.50

Silica Brick

Pennsylvania and Birmingham	\$73.00
Chicago District and Alabama	82.00
Silica cement, net ton (Eastern)	12.50
East Chicago	13.50

Chrome Brick

Standard chemically bonded, Balt., Plymouth Meeting, Chester	\$64.00
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Magnesite Brick

Standard, Balt. and Chester	\$86.00
Chemically bonded, Baltimore	75.00

Grain Magnesite

std. 1/2-in. grains	
Domestic, f.o.b. Balt. and Chester in bulk, fines removed	\$51.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	27.00
In sacks with fines	31.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢	\$11.05
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PRICES

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia.....	\$4.45-	\$5.66-	\$5.90-	\$4.85-	\$5.98-	\$4.87	\$4.58	\$4.91	\$5.65-	\$8.50-	\$8.80	\$10.38	\$10.63
New York.....	4.97	5.81	5.92	5.36	6.55				5.73	8.65			
Boston.....	4.74-	5.70 ¹ -	6.19	5.08-	6.05-	5.09-	4.77-	5.05-	5.78	8.58-	8.73-	10.23-	10.43-
Baltimore.....	4.79	5.95 ¹		5.58	6.30	5.14	4.82	5.08		8.73	8.88	10.43	10.58
Norfolk.....	4.88	5.74	6.28	5.64	6.90	5.23	4.94	5.09	5.96	9.05	9.20	10.51	10.66
Chicago.....	4.27		5.62	4.79		4.72	4.69	4.84	5.66				
	4.90			5.30		5.15	5.15	5.20	6.00				
	4.20	5.00	5.88	4.35	5.35-	4.55	4.35	4.35	5.00-	8.20	8.35	9.50	9.65
					6.65				5.10				
Milwaukee.....	4.42	5.22	5.87	5.02	5.57	4.77	4.57	4.57	5.334	8.534	8.604	9.784	9.984
Cleveland.....	4.20	5.00 ¹	5.74	4.52	5.95	4.55 [†]	4.67	4.35	5.00-	8.64	8.79	9.50	9.65
									5.10				
Buffalo.....	4.25	5.15	6.06	5.26	5.72	4.96	4.40 [†]	4.40 [†]	5.10	8.20	8.35	9.50	9.65
Detroit.....	4.60	5.45	6.07	4.80	5.70	4.90 [†]	4.80	4.50	5.16	8.72-	8.87-	9.94-	10.14-
										8.87	9.02	10.17	10.32
Cincinnati.....	4.59	5.22	5.57	4.80		4.96	4.80	4.76	5.59 [‡]	8.85	9.00	10.16	10.31
St. Louis.....	4.59	5.39	6.17-	4.69-	5.97	4.89-	4.74	4.74	5.62	8.82	8.97	10.07	10.27
Pittsburgh.....	4.20-	5.10 ¹	5.65	4.30-		4.55	4.35	4.35	5.00	8.20	8.35	9.50	9.65
	4.25			4.35									
St. Paul.....	4.66	5.46	6.01	4.76		5.01	4.81	4.81	5.94				
Omaha.....	5.31		6.76	5.41		5.66	5.41	5.46	6.06				
Indianapolis.....	4.52	5.31	5.96	4.62	5.72-	4.87	4.67	4.67	5.52			9.97	10.17
					5.87								
Birmingham.....	4.45 ¹¹		5.80	4.45 ¹¹		4.65 ¹¹	4.40 ¹¹	4.40 ¹¹	6.13				
Memphis.....	4.91 ¹¹	5.98 ¹¹	5.08 ¹¹	5.11 ¹¹	5.23 ¹¹	5.21 ¹¹	5.01 ¹¹	5.01 ¹¹	5.50				
New Orleans.....	*5.08 ¹¹	6.44 ¹¹		6.28 ¹¹		5.38 ¹¹	*5.10 ¹¹	*5.18 ¹¹	6.34 ⁶				
Houston.....	5.55		7.21	5.65		5.90	5.70	7.00	9.40	9.25	10.40	10.55	
Los Angeles.....	5.70	7.25 ¹	7.30	6.00	8.60 ⁶	5.35	5.15 ^{**}	5.45	7.25 ¹⁴	9.55 ¹⁶	9.40 ¹⁶	10.95 ¹⁶	11.15 ¹⁶
									7.35 ¹⁴				
San Francisco.....	5.35 ⁶	6.55-	7.05-	5.70 ⁶	8.60	5.30	5.10 ^{**}	5.00	7.40	9.55 ¹⁵	9.40 ¹⁵	10.95 ¹⁵	11.15 ¹⁵
		7.25	7.45										
Seattle.....	5.45 ⁴	7.25 ²	7.10 ²	6.15 ⁴		5.60 ⁴	5.30 ⁴	5.65 ⁴	7.35 ¹⁴	8.70 ¹⁵	9.70 ¹⁵		11.30 ¹⁵
									7.45 ¹⁴				
Portland.....	7.70 ⁴	7.25 ²	7.10	5.85 ⁴		5.70 ⁴	5.40 ⁴	5.65 ⁴	7.45 ¹⁴		8.95 ⁶		11.30 ¹⁵
Salt Lake City.....	6.40		7.85	6.70		6.00	6.25	6.56	7.55				

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13)

400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

‡ Add 41¢ for sizes not rolled at Buffalo.

** Add 15¢ for sizes not rolled at Geneva.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT* PRICES

DELIVERED PRICES† (BASE GRADES)

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem.....	40.00	40.50	41.00	41.50	.....	Boston.....	Everett.....	\$0.50 Arb.	.....	45.50	46.00	.....	.....
Birmingham.....	38.88	39.38				Boston.....	Steelton.....	6.27	46.27				52.27
Buffalo.....	40.00-	40.00-	40.50			Brooklyn.....	Bethlehem.....	3.90	43.90	44.40	44.90	45.40	
	42.38*	42.88*	43.38*			Cincinnati.....	Birmingham.....	6.09	44.97	45.47			
Chicago.....	38.50	39.00	39.50	40.00	.....	Jersey City.....	Bethlehem.....	2.39	42.39	42.89	43.39	43.89	
Cleveland.....	38.50-	39.00-	39.50-			Los Angeles.....	Provo.....	6.93	45.93	44.43			
	39.75*	40.25*	40.75*			Mansfield.....	Cleveland-Toledo.....	3.03	41.53-	42.03-	42.53		
Duluth.....	39.00	39.50	40.00	40.50	.....				42.78*	43.28*	43.78*		
Erie.....	38.50	39.00	39.50	40.00	.....	Philadelphia.....	Bethlehem.....	2.17	42.17	42.67	43.17	43.67	
Everett.....		45.00	45.50			Philadelphia.....	Swedeland.....	1.31	46.31	46.81	47.31	47.81	
Granite City.....	45.25	45.75	46.25			Philadelphia.....	Steelton.....	2.81	42.81				48.81
Neville Island.....	42.00	42.50	42.50	43.00	.....	San Francisco.....	Provo.....	6.93	45.93	46.43			
Provo.....	39.00	39.50				Seattle.....	Provo.....	6.93	45.93	46.43			
Sharpsville.....	39.00	39.50	39.50	40.00	.....	St. Louis.....	Granite City.....	0.75 Arb.	46.00	46.50	47.00		
Steelton.....	40.00				46.00								
Struthers, Ohio.....	42.50												
Swedeland.....	45.00	45.50	46.00	46.50	.....								
Toledo.....	38.50	39.00	39.50	40.00	.....								
Troy, N. Y.....					46.00								
Youngstown.....	39.00	39.50	39.50	40.00	.....								

* Republic Steel Corp. price. Basis: pig iron at Cleveland and Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Basing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00

pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio—\$53.50; f.o.b. Buffalo—\$54.75. Add \$1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct

Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus \$58.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, \$65.55. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Phila., New York, Birmingham. Carload lots (bulk)\$145 F.o.b. Rockwood, Tenn.\$150 Less ton lots (packed) 183.00 Delivered Pittsburgh 161.00 \$1.80 for each 1% above 82% Mn; penalty, \$1.80 for each 1% below 78%. Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk ...	8.70	8.95	9.50
Ton lots 10.30	10.90	12.80	
Less ton lots ... 11.20	11.80	13.70	

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads \$61.00	\$63.00	
F.o.b. Pittsburgh, h. 60.00	61.00	

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

	96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
Carload, bulk 32	
L.c.l. lots 34	

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

	Carloads	Ton lots	Less ton lots
.....	32	34	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.07% max. C. 0.06% P, 90% Mn.	23.00	24.85	26.05
0.10% max. C.	22.50	24.35	25.55
0.15% max. C.	22.00	23.85	25.05
0.30% max. C.	21.50	23.35	24.55
0.50% max. C.	21.00	22.85	24.05
0.75% max. C.			
7.00% max. Si.	18.00	19.85	21.05

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

	Carload bulk	Ton lots
.....	7.80	9.45
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	8.75	
Ton lots 10.35		
Less ton lots 11.25		

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, openhearth \$78.00, foundry, \$79.00; \$78.75 f.o.b. Niagara Falls; \$77.50 f.o.b. Jackson, Ohio. Electric furnace silvery iron is not being produced at Jackson. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe. 16.90	17.50	18.10	
97% Si, 1% Fe. 17.30	17.90	18.50	

Silicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk ... 5.25	5.50	5.70	
Ton lots 6.85	7.45	7.75	
Less ton lots ... 7.75	8.35	8.65	

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si 16.80			
50% Si 9.30	9.80	10.00	
75% Si 11.80	12.10	12.35	
85% Si 13.30	13.60	14.35	
90% Si 15.00	15.30	16.00	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings Distilled
Ton lots \$1.85	\$2.70 \$3.40
Less ton lots ... 2.20	3.05 4.20

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C 26.50	26.90	27.00	
0.10% C 26.00	26.40	26.50	
0.15% C 25.50	25.90	26.00	
0.20% C 25.25	25.65	25.75	
0.50% C 25.00	25.40	25.50	
1.00% C 24.50	24.90	24.75	
2.00% C 24.25	24.65	24.75	

	65-69% Cr	4-9% C	62-66% Cr, 4-6% C
.....	18.60	19.00	19.15
6-9% Si.	19.45	19.85	20.00

Briquets—Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk ... 12.50	12.75	12.85	
Ton lots 14.00	14.90	15.50	
Less ton lots ... 14.90	15.80	16.40	

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload 19.70	20.10	20.25	
Ton lots 21.85	23.15	23.95	
Less ton lots ... 23.35	24.65	25.45	

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% mn, 1.25% max. C.

	Eastern	Central	Western
Carload 25.00	25.40	25.50	
Ton lots 27.30	27.95	29.15	
Less ton lots ... 29.10	29.75	30.95	

Chromium Metal

Contract prices, cents per lb. chromium contained carload packed, f.o.b. shipping point freight allowed, 97% min. Cr. 1% max. Fe.

	Eastern	Central	Western
0.20% max. C. .. 97.00	98.50	99.75	
0.50% max. C. .. 93.00	94.50	95.75	
9.00% min. C. .. 91.50	93.00	94.25	

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe
r 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads 16.25	16.75	18.80	
Ton lots 19.35	20.10	22.25	
Less ton lots ... 20.85	21.60	23.75	

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.			
	Eastern Central Western		
Carloads	17.50	18.00	20.05
Ton lots	19.80	20.65	22.40
Less ton lots	20.80	21.65	23.40

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots 18.00	19.10	21.05	
Less ton lots ... 19.25	20.35	22.30	

V Foundry Alloys

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn. V-7: 28-32% Cr, 15-21% Si, 14-16% Mn.

	14.60¢	15.85¢
Ton lots 14.60¢	15.85¢	
Less ton lots ... 15.85¢		

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed. Si 56%, Ti 9% Ca 5%.

	17.90¢	19.40¢
Ton lots 17.90¢	19.40¢	
Less ton lots ... 19.40¢		

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots 16.75	16.85	18.80	
Less ton lots ... 17.00	18.10	20.05	

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed... \$2.35

Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V. Openhearth \$2.90 Crucible 3.00 High speed steel (Primos)... 3.10

Vanadium pentoxide, 88-92% V₂O₅, contract basis, per pound contained V₂O₅ \$1.20

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb Ton lots \$2.50 Less ton lots \$2.55

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. 95¢

Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. 80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo. 80¢

Molybdenum oxide in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo. 80¢

Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti \$1.23

Ferrotitanium, 20-35%, 0.10% C max., ton lots, per pound contained Ti \$1.35 Less ton lots \$1.40

High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton... \$152.50

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton \$65.00 Less ton lots \$1.25

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy. Carload lots 18.40¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy Carload, bulk 6.00¢

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y. Carload 7.20¢ Ton lots 7.70¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound Car lots 9.50¢ Ton lots 10.35¢

Boron Agents
Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboration, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

Eastern Central Western \$1.20 \$1.23 \$1.21

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots ... \$1.89 \$1.903 \$1.935
Less ton lots 2.01 2.023 2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots... \$1.80 \$1.8125 \$1.8445

Silicaz, contract basis, f.o.b. plant freight allowed, per pound. Carload lots 39.00¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1 93¢
No. 6 63¢
No. 79 45¢

Bortam, f.o.b. Niagara Falls Ton lots, per pound 45¢ Less ton lots, per pound 50¢

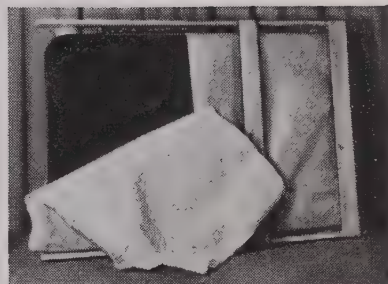
Carbortam, f.o.b. Suspension Bridge, N. Y. freight allowed. Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.

Ton lots, per pound 8.625¢

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3%-4%, Si 40%-45%, per lb contained B \$6.31



Air-flown flowers arrive garden-fresh. That's because they're insulated with protective KIMPAK. Insulation Packaging Photo courtesy of United Wholesale Florists of Calif., Inc.



Surface Protection — Table top. Photo Courtesy Drexel Furniture Co.



Flotation Packaging — Dental Model. Photo Courtesy Kramer Dental Studio.

Free booklet on better packaging methods. Call or write your local distributor for the illustrated KIMPAK book on how to improve your present packaging. He is listed in the Classified Directory. If you prefer, simply mail this coupon.

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Please send me the free KIMPAK booklet that tells how I may better my packaging methods. IA-748

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Firm

Type of Business

Address

City, Zone, State

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cradles your products... protects your profits

Don't let shipping damage claims eat away your profits! Cushion every product you package with soft, strong KIMPAK* creped wadding. For KIMPAK provides low-cost protection from shipping room to journey's end.

It is amazingly versatile. Clean and grit-free, KIMPAK safeguards a wide variety of items... from delicate glass to hardy machine parts. Keeps its resiliency under continuous shock and vibration. And light in weight, compact, it adds little bulk to shipments.

KIMPAK is popular with packaging

personnel. It is pleasant to handle, clean, and takes up a minimum of storage space. What's more, fleecy-white KIMPAK enhances the sales appeal of any product—it's that good looking.

You may choose from a number of thicknesses, backed or unbacked, liquid-repellent or liquid-absorbent—sheets, rolls, or pads. In fact, there is a specification of reliable KIMPAK to meet every requirement of the Four Basic Methods of Interior Packaging... Surface Protection, Flotation Packaging, Blocking and Bracing, and Absorbent Packaging.

Kimpak

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CREPED WADDING

(Continued from p. 112)

• **J. C. Carr** has joined the Burndy Engineering Co., Inc., New York, as sales promotion manager. Mr. Carr was formerly connected with the Kollsman Instrument Div. of the Square D Co.

• **Harlan G. Pingrey** has been appointed sales promotion manager of the Thor Corp., Chicago. Mr. Pingrey was formerly advertising manager of the South Wind Heater Div., Stewart-Warner Corp.

• **Allan W. Walter** has been named financial vice-president of Liquid Carbonic Corp., Chicago. He comes to Liquid from Magnavox Corp.

• **A. Price Drummond** has been appointed manager of engineering in the machine tool division of the Pratt & Whitney Div., Niles-Bement-Pond Co., W. Hartford, Conn. He had been with the National Carbon Co. since 1924. **Paul Mueller**, formerly Pratt & Whitney machine tool engineering head, will now devote full time to engineering research, being associated with Milton Chandler, engineering head of the Chandler-Evans Div.

• **R. V. Schageman** has been appointed district sales manager at Chicago for McConway & Torley Corp. Mr. Schageman succeeds J. J. Hughes who died recently.

• **Raymond Boyer** has been appointed assistant factory manager of Ohmer Corp. in charge of product engineering and patent controls. He will be assisted by **Edward Warrick**, who has been made product engineer on Ohmer cash registers; **Norman Young**, experimental design on cash registers; **J. E. Hopping**, product engineer on Ohmer fare registers and counters, and **A. S. Wheelbarger**, supervisor of experimental and development work and product engineer on Class 100 taximeter.

• **Lt. Gen. Eugene Reybold** has been appointed vice-president in charge of operations, Lustron Corp., Columbus, Ohio. Before his retirement from the U. S. Army in 1945, Gen. Reybold was chief of the Engineer Corps. **Richard N. Jones** has been appointed vice-president in charge of sales of Lustron. Mr. Jones was formerly associated with the magazines Building Age and Architectural Forum. **Charles W. Sawyer** has been named director of



I'm "Crimpy"
THE BUFFALO WIRE CLOTH MAN!

My wardrobe is the most complete you've ever seen. I'm ready for any occasion, to withstand everything from ordinary wear to rust, corrosion and excessive heat.

TODAY I'M GALVANIZED AFTER WOVEN

COATED? EVERY BIT OF ME!

Know why? I'm hot dipt. But first I'm cleaned. Then, mind you, I'm pickled. Just try and work my coating loose!



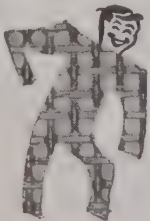
AM I SMOOTH? AM I BRIGHT?

I'll say I am! I've just the right amount of zinc. Not too much. That would cause "points". Not too little. That would cause "pitting". Brother, I'm Controlled.



TAKE A LOOK AT MY NODES!

Ever see anything like them? Course not! They're sealed closed. Why, my joints are so smooth that one week I'm a tobacco apron and the next I'm a rayon conveyor.



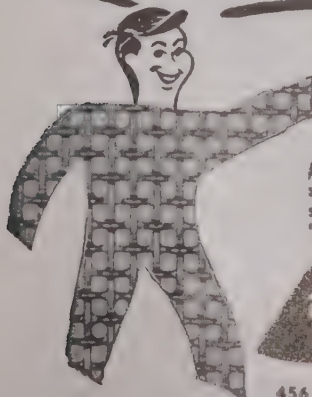
LIKE MY SHAPE?

True and flat, isn't it? Stays that way, too! You don't see me buckling when I'm rolled out. Cut me into small pieces if you like. I'll still be square and rigid.

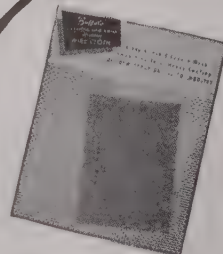


**DON'T TAKE MY WORD
FOR ALL THIS —**

Write my
manufacturer for **FREE FOLDER 597.**



A valuable piece of literature about the unusual strength, firmness and wearing qualities; smooth surface, faster screening and accurate mesh of "Buffalo" Galv. After Woven Wire Cloth.



Buffalo WIRE WORKS CO., INC.

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456 TERRACE

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CARDOX

offers all THREE

● **EXTINGUISHMENT**

● **PREVENTION**

● **DETECTION**

How thoroughly have you analyzed your fire problems?—and how recently? Are you fully informed in all that is new in methods and equipment for improved protection of every type of fire hazard? As a leader in all three vital phases of fire protection... *Extinguishment, Prevention, and Detection*... Cardox offers you practical cooperation in determining the most efficient method... or combination of methods... for guarding against staggering fire losses.



EXTINGUISHMENT

Cardox engineered applications of low-pressure carbon dioxide give this fast-acting, non-damaging extinguishing medium maximum effectiveness in conquering fires, large or small, both indoors and out. Cardox Fire Extinguishing Systems offer broadscale protection with centrally located, compactly designed storage units with capacities of 500 pounds to 125 tons of Cardox CO₂, and Mobile Units with capacities of 750 pounds to 3 tons. Bulletin S-278.



DETECTION

Cardox Detection Systems, actuated by heat, smoke or flame, give prompt warning of incipient fires. These systems, with detectors located throughout large establishments... may be used purely as a warning device, or may be engineered to actuate an extinguishing system.



PREVENTION

Cardox Atmosphere Inerting Systems are available to provide inert gas for *continuous* fire and explosion prevention in the handling and storage of flammable liquids, chemicals, paints, varnishes, and solvents, or where other materials in storage present serious fire and explosion hazards. These systems also are used to provide an economical source of inert gas as part of continuous production processes. Bulletin C-278.

CARDOX CORPORATION

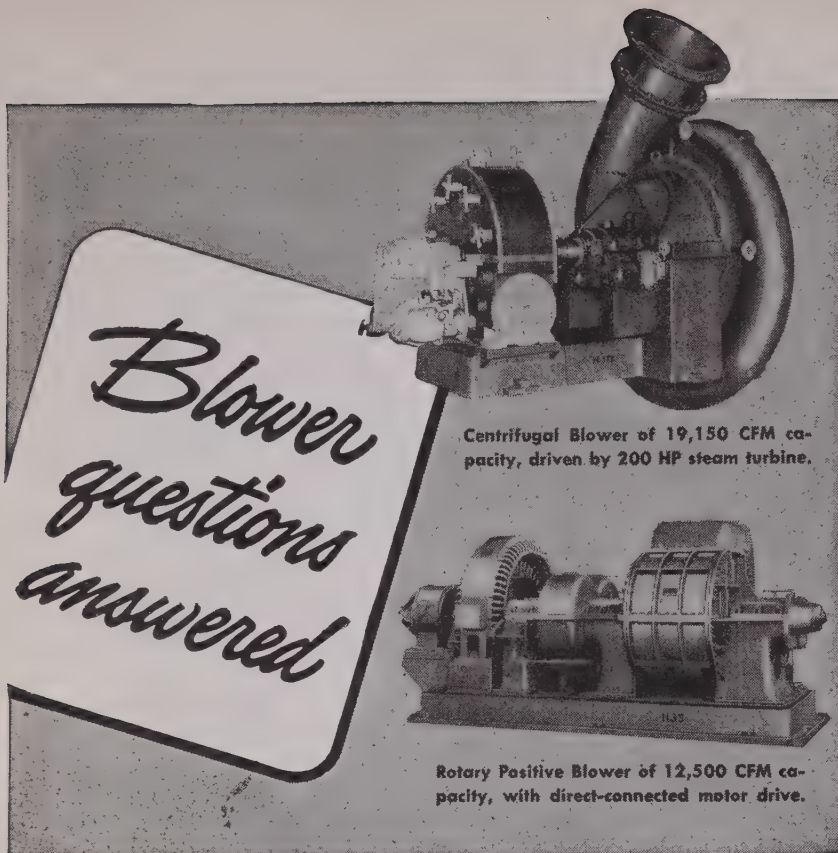
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CARDOX

CO₂ FIRE EXTINGUISHING SYSTEMS



by R-C dual-ability

When you put your blower questions up to Roots-Connorsville, you gain these important advantages:

1. Long experience in the adaptation of blowers to needs of the iron and steel industry, coupled with the forward-thinking of our alert engineers.
2. Our *dual-ability* to supply either Rotary Positive or Centrifugal Blowers, whichever type is best fitted to the specific work.
3. A wide range of standard capacities, from 5 CFM to 50,000 CFM (or higher), adapted to any modern drive, which makes for lower prices and faster deliveries than "special" designs.

Finally, when you have selected the R-C Blower that satisfies your requirements, you can be certain of sound, sturdy construction, low maintenance and operating costs, and a long life of profitable performance. For accurate answers to your blower questions, consult us.



In 1858, when the Atlantic Cable carried its first message, "Roots" had been building blowers for four years, since 1854. We're not good because we're old, but old because we're good.

**ROOTS-CONNERSVILLE
BLOWER CORPORATION**
807 Alabama Ave., Connorsville, Indiana

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ROTARY CENTRIFUGAL

BLOWERS • EXHAUSTERS • BOOSTERS • LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

★ ★ ONE OF THE DRESSER INDUSTRIES ★ ★

PERSONALS

styling for Lustron Corp. In his last position Mr. Sawyer was in charge of special projects in the division of styling, Chrysler Motors.

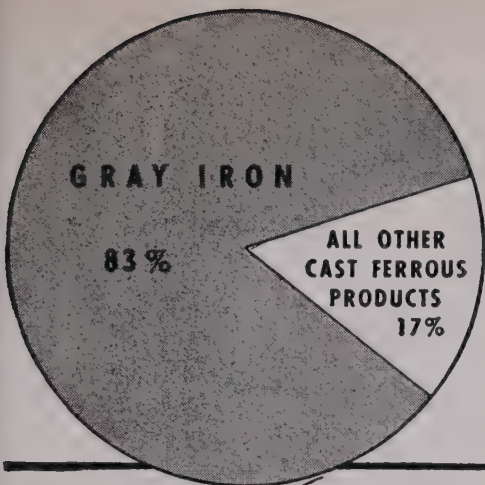
• **S. T. Walz** has been appointed southeastern regional manager of the Square D Co., with headquarters in Atlanta. He was formerly manager of the Birmingham office. **K. R. Morris** has been named eastern regional manager with headquarters in Baltimore. Mr. Morris was formerly office manager in Baltimore. **R. W. Thompson** has been appointed midwestern regional manager with headquarters in St. Louis. Mr. Thompson was formerly Chicago district office manager.

• **William C. Hanson**, president and director, and **Hjalmer Hallgren**, vice-president and director, National Iron Co., Duluth, have retired. **Carl Erickson** has been named president and general manager; **Lewis C. Erickson**, vice-president and chief engineer; **Lester E. Erickson**, vice-president and general superintendent; and **Charles Eisenberg**, secretary and treasurer of the company.

• **Fred W. Roth** has been named vice-president in charge of Trenton, N.J., plant operations for the Gould Storage Battery Corp., a subsidiary of the National Battery Co. Mr. Roth was works manager of the Trenton plant of the Storage Battery Div., Philco Corp. when it was merged with Gould in 1947.

• **R. Kirby Shirley** has been elected vice-president and a director of Freeport Sulphur Co., New York. Mr. Shirley joined the company in 1922, was elected treasurer in 1934 and vice-president and treasurer in 1940. **Pearson E. Neaman** has been named vice-president and general counsel and has also been elected a director. Mr. Neaman came to the company as secretary in 1930 and was elected a vice-president in 1945.

• **Willis J. Stillwell** has been appointed vice-president of Irvington Varnish & Insulator Co., Irvington, N.J. He joined the company in 1942 and since 1945 has been assistant to the president. **John W. Apgar** has been appointed assistant to the general manager of the



A *Big Piece* OF A BIG PIE

Of all foundry products made in the United States, over 80 per cent are gray iron—12,540,960 tons of gray iron products produced last year.

A giant industry, yes. But not an industry of giants. Some 2500 individual foundries produced this volume, supplying gray iron parts to virtually every metalworking industry in the country.

Gray Iron Founders' Society, representing nearly 75 per cent of the industry's capacity, has launched a long-range program of advancement for the mutual benefit of users and producers of gray iron components.

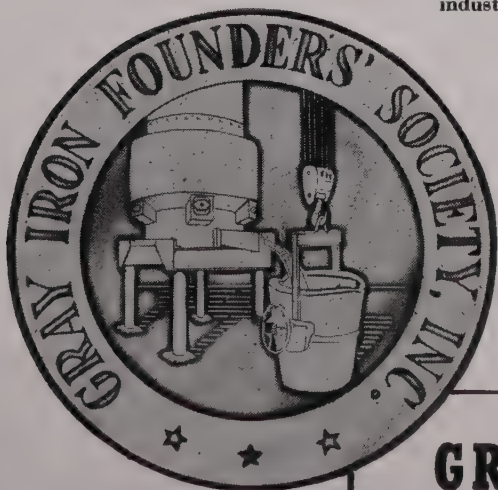
**"MAKE IT BETTER
WITH GRAY IRON"**

Important points in this program are:

1. Assistance to users and potential users of gray iron in making their products better, in lowering their costs, or both.
2. Consultation and service to help members improve their products and processes.
3. Education—within the membership, in technical schools and throughout industry as a whole—on the uses and characteristics of gray iron components.

Consider These Gray Iron Characteristics:

- | | |
|---------------------------------|---|
| 1. Corrosion resistance | 7. Low notch sensitivity |
| 2. Machinability | 8. Durability |
| 3. Damping capacity | 9. Castability—dimensional accuracy |
| 4. Rigidity | 10. Wide selection of mechanical properties |
| 5. Abrasion and wear resistance | |
| 6. Heat resistance | |



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SOCIETY, INC.** 33 PUBLIC SQUARE
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that you want?

20% STAINLESS
80% MILD STEEL



Chances are, IngAclad Stainless-Clad Steel has everything you want for any application where stainless is needed only on the exposed or contact side. Look what it gives you —

TOP PROTECTION on the stainless side. The 20% cladding of solid stainless means maximum resistance to rust, corrosion, abrasion, erosion.

EASY FABRICATION. The 80% backing of mild steel means easy workability.

VERSATILITY. Uses limited only by your own ingenuity. Already proved in scores of applications in dozens of industries.

ECONOMY. In first cost . . . in fabricating cost. If that's what you want — you want IngAclad. Why not investigate its possibilities now? Full details on request — no obligation.

INGERSOLL Steel Division, Borg-Warner Corporation, 310 South Michigan Avenue, Chicago 4, Illinois.
Plants: Chicago, Illinois; New Castle, Indiana; Kalamazoo, Michigan.



PERSONALS

coating division. He was formerly sales manager of the coating division and has been with the company 20 years. **Donald May** who has held the post of sales service manager of this division, succeeds Mr. Apgar. Mr. May joined the firm in 1942.

• **Robert L. Hanson** has been named manager of Allen-Bradley Co.'s Pittsburgh office. Mr. Hanson was formerly connected with Wagner Electric Corp., Crocker-Wheeler Co. and Sperry Corp.

• **Parker H. Ericksen** has been appointed director of sales, Bendix Home Appliances, Inc., South Bend, Ind., succeeding **W. F. Linville**, resigned. Since 1943 Mr. Ericksen has been vice-president in charge of sales of Majestic Radio & Television Corp. and president of Majestic Records, Inc.

• **Raymond T. Anderson** has been appointed general passenger traffic manager of the Santa Fe Ry. System with headquarters in Chicago. Mr. Anderson first became associated with the Santa Fe in 1914 in the operating department.

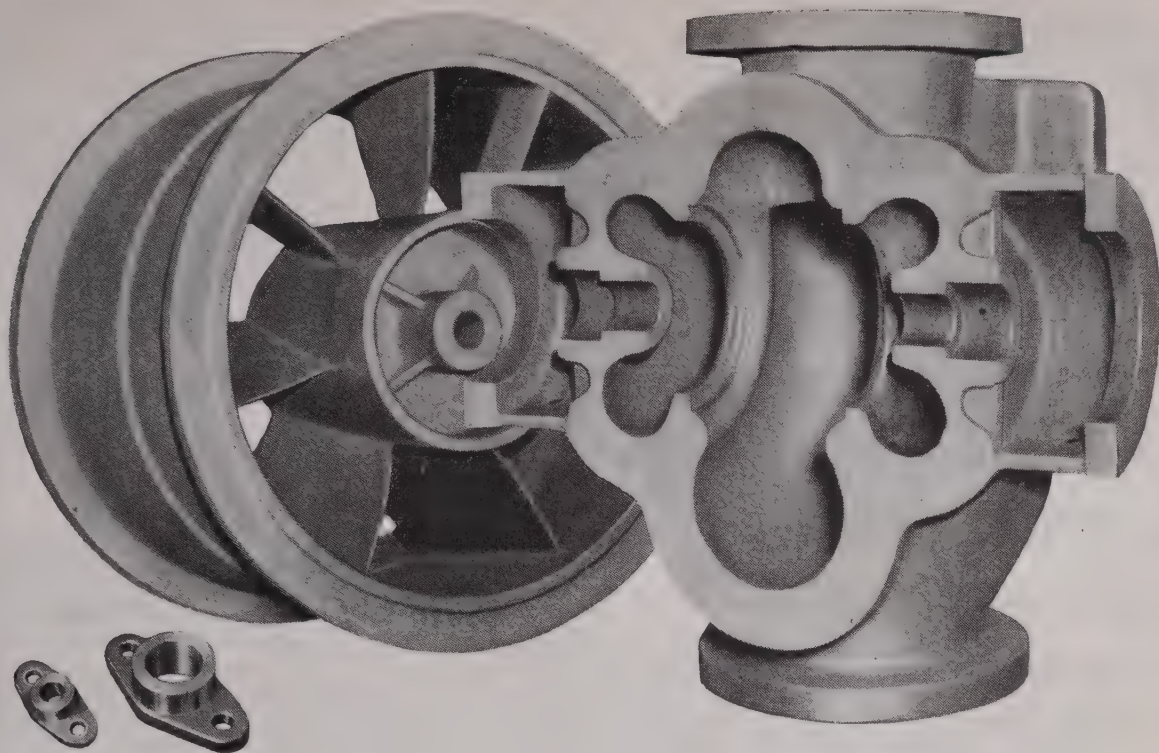
• **Frank H. Connolly** has been appointed general sales manager, Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N.Y. Mr. Connolly was formerly connected with the Mobilift Div., Vaughan Motor Co.

• **Dr. Henry H. Hausner** has joined the staff of the Metallurgical Research and Development Laboratories of Sylvania Electric Products Inc., Bayside, N.Y. Dr. Hausner was formerly connected with the Ceramics & Steatite Corp., Nichols Research & Engineering Corp., the War Dept. and the American Electro Metals Corp.

• **Russel J. Aurentz** has been appointed district manager and **John F. McGoey** assistant district manager of Luria Bros. & Co., Inc., at Reading, Pa. Mr. Aurentz joined the company in 1917 and has been in the Reading office for the past 15 years. Mr. McGoey has completed 25 years with the company.

• **Leonard J. Edwards** has been appointed New England sales representative of C. I. Hayes, Inc., Providence. Mr. Edwards was for many years field sales manager for General Alloys Co., Boston.

• **Harold H. Martin** has been appointed district representative for Wisconsin and **Chris Wagner** will cover the Southern California area.



"Custom-Engineered" Castings — for Long Range Economy

*For longer, more economical service, N-B-M non-ferrous structural castings
are tailor-made to your own specific application*

Seldom are two structural casting problems precisely the same. A pump housing, for instance, presents certain requirements, while an impeller may call for a completely different alloy and casting technique.

Because of these innumerable combinations, N-B-M engineers make a specialty of research and manufacturing development — an approach that in the last 74 years has built up a tremendous backlog of experience in solving the most complex problems of casting design.

The unique engineering service of National Bearing Division includes a complete study of the important factors involved in each casting application. The unvarying result of this N-B-M service is

to find the answers to such problems as:

The Proper Alloy—for long, trouble-free service and increased resistance to corrosion.

The Proper Casting Design—for a high factor of strength to handle safely the projected loads, pressures and stresses.

The Proper Casting Technique—for close tolerances consistent with maximum economy and ease of finished machining operations.

Any successful application of a structural part—large or small — depends on the correct solution to these basic problems of design. Let the specialized approach and broad experience of National Bearing Division find the right answers for you.



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NATIONAL BEARING DIVISION

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PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

* RECOMMENDATION:

*Soak buffed steel parts
5 to 10 minutes in a 50
Oakite Emulsion No. 24
at 80 to 90 F.*

For every metal-cleaning job there is an efficient Oakite method:

Precleaning in tanks
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machines

*** Alkaline cleaning**
in tanks

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in machines

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FOR MORE INFORMATION about these and other processes—burnishing, anti-rusting, controlling water-wash in paint spray booths, cooling and lubricating machining and grinding operations—consult the Oakite Technical Service Representative in your vicinity or write for descriptive literature.

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Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE

PERSONALS

for the Sapphire Products Div., Elgin National Watch Co. Mr. Martin was formerly field engineer for the Sheffield Corp. of Dayton. Mr. Wagner was formerly camera shop foreman for Berndt Bach Corp. and head of the mechanical research department of Frank Rieber, Inc.

• **Lloyd J. Bohan** has been appointed representative in the Los Angeles area for the Claud S. Gordon Co., Chicago.

• **William H. Jones** has been appointed representative in the eastern Pennsylvania and New Jersey territory of the Lovejoy Tool Co., Inc., Springfield, Vt.

• **Mrs. Katherine G. Carlton, Mary K. Carlton, Frank Moran, William A. Dermody and Fred W. McIntyre, Sr.** have been appointed directors of the Carlton Machine Tool Co., Cincinnati. Mr. Dermody has been elected president and general manager succeeding **Jack C. Carlton**, who died recently. Mr. Moran has been named vice-president and treasurer; **James V. Carlton**, secretary, and **Mary K. Carlton**, assistant treasurer.

• **J. E. Carter**, federal tax counsel for the B. F. Goodrich Co., Akron, Ohio, has been named assistant secretary.

• **H. R. Klepinger** has retired as superintendent of special assignments for American Steel & Wire Co., Cleveland.

• **J. W. Moore** has been appointed sales manager of Hoskins Mfg. Co., Detroit. Mr. Moore was formerly district manager in Pittsburgh and responsible for sales in Michigan, Ohio, Kentucky and Tennessee districts.

• **Gordon L. Walker** has been named director of security and communications for the industrial relations department, Ford Motor Co., Dearborn, Mich. **Malcolm W. Welty**, staff assistant to the manager of industrial relations has been appointed director of personnel planning and analysis. **William C. Ford** has been elected to the board of directors, replacing **B. J. Craig**, vice-president and treasurer, who has resigned.

• **C. Wayne Brownell** has been named industrial relations manager of Packard Motor Car Co.,

AIRCRAFT, AUTOMOBILES, TRUCKS, A

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PRECISION MADE SCREW MACHINE PRODUCTS

COMPLETE FACILITIES

SCREW MACHINES

**ALL SECONDARY
OPERATIONS:**

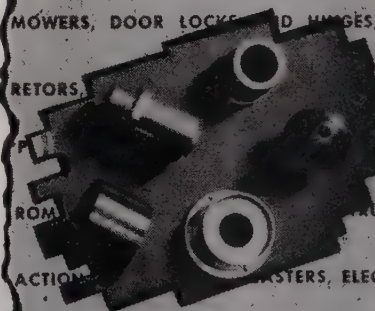
TURRET LATHES

MILLING MACHINES

GRINDING

**HEAT TREATING,
PLATING**

**BAR CAPACITY
3/4" to 5 1/2"**



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SEND US YOUR PRINTS TODAY

POWER TOOLS, THERMOSTATS, CARBU

NG DEVICES, SPRAY GUN



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Amherst, Ohio



A Great Seller

...because it's a
Comfortable
Eye-Protector!



AO F-9200 Acetate Goggle

When we brought it out, we were sure there was a great future ahead for this goggle of non-flammable cellulose acetate butyrate—but its popularity has surprised even ourselves! Here are its features that workers appreciate:

1. ASSURED PROTECTION.
2. Hinges and temples out of line of sight.
3. Smarter appearance.
4. Lenses that conform to and cover eye orbit.
5. Improved fit.
6. Comfortable, lightweight, face-formed bridge.
7. Nosepads which distribute goggle weight *evenly*.

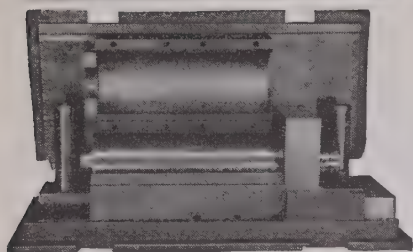
This goggle does a prime protection job on operations in chemical and electrical plants where the tiniest spark might cause fire or explosion. Because of its acetate construction it is especially recommended for these and similar jobs where metal goggles might not be recommended. Available with ventilated side shields for added safety against lateral-striking objects. Lenses are 6-Curve Super Armorplate. When protection from glare, ultra-violet or infra-red radiations is a "must", specify Calobar lenses. For a handy source of supply, see the AO representative. There is always one near you.

Safety Division of

American  Optical
COMPANY

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

**Made of HOLLIDAY
SPEED CASE and
SPEED TREAT Plates**



**total
die
cost
reduced.. 23%**

The use of *Speed Case* and *Speed Treat* Plates in making this 20" x 45" punch and die for forming No. 12 gauge 8" diameter furnace pipe provided an overall cost saving of 23% to Beach Specialty Co., St. Clair Shores, Michigan. Machining time was sharply reduced compared with other steels. Both punch and die were hardened in water.

You, too, can profit substantially through the incomparable machinability and ready responsiveness to heat treatment of *Speed Case* and *Speed Treat* steels. Ask our nearest representative for full information.

W. J. HOLLIDAY & CO., INC.

Speed Case - Speed Treat Plate Division
HAMMOND INDIANA

Plants at Hammond and Indianapolis
**SPEED CASE — SPEED TREAT
WAREHOUSE DISTRIBUTORS**
AKRON 1, Ohio

The Burger Iron Company
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Beals, McCarthy and Rogers, Inc.
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HOUSTON 1, Texas
Earle M. Jorgensen Co.
LOS ANGELES 54, California
Earle M. Jorgensen Co.
MEMPHIS 2, Tennessee
Pidgeon-Thomas Iron Company
NEWARK 5, New Jersey
Grammer, Dempsey & Hudson, Inc.
OAKLAND 7, California
Earle M. Jorgensen Co.
PHILADELPHIA 34, Pennsylvania
Horace T. Potts Co.

CANADA:

Toronto 2, Ontario, Peckover's, Ltd.

SPEED CASE
Low Carbon
SPEED TREAT
Medium Carbon
Open Hearth • Free Machining
STEEL PLATES

PERSONALS

Detroit. Mr. Brownell has been Packard's labor relations manager since 1945.

• **Holsey C. Simpson** has been appointed production manager of the Dumore Co., Racine, Wis. Mr. Simpson has been with the Dumore Co. since 1942.

• **Hubert L. Byrd** has been appointed manager of the John Bean Div., Food Machinery Corp. at Lansing, Mich. **Howard L. Shannon** succeeds Mr. Byrd as manager of the Florida Div. at Lakeland. **G. C. Jones**, formerly staff assistant for the Anderson-Barngrover Div., succeeds Mr. Shannon as assistant manager of the Bean-Cutler Div., San Jose, Calif.

Obituaries

• **Samuel L. Peeples**, division freight agent at Birmingham for the Central of Georgia Ry., died June 2.

• **James A. Powell**, 60, chief mechanical engineer of Stone & Webster Engineering Corp., Boston, died June 9. He had been mechanical engineer since 1941 and chief mechanical engineer since 1945.

• **James O. Sandberg**, 32, western New York representative of the Syracuse Bearing Co., Buffalo, died June 7.

• **Elliott R. Jones**, 48, plant superintendent of the Lumen Bearing Co., Buffalo, died June 6.

• **Charles E. Underwood**, 63, superintendent, coke oven division, Bethlehem Steel Co., Bethlehem, since 1916, died June 13.

• **Sam Coplan**, 51, of Max Schlossberg Co., Chicago, died June 3. He joined the company in 1946.

• **Charles W. Nash**, 84, chairman of the board, Nash-Kelvinator Corp., Detroit, died June 6.

• **Frank M. Hardiman**, 58, general manager of Harrison Radiator Div., General Motors Corp., Lockport, N.Y., died June 11.

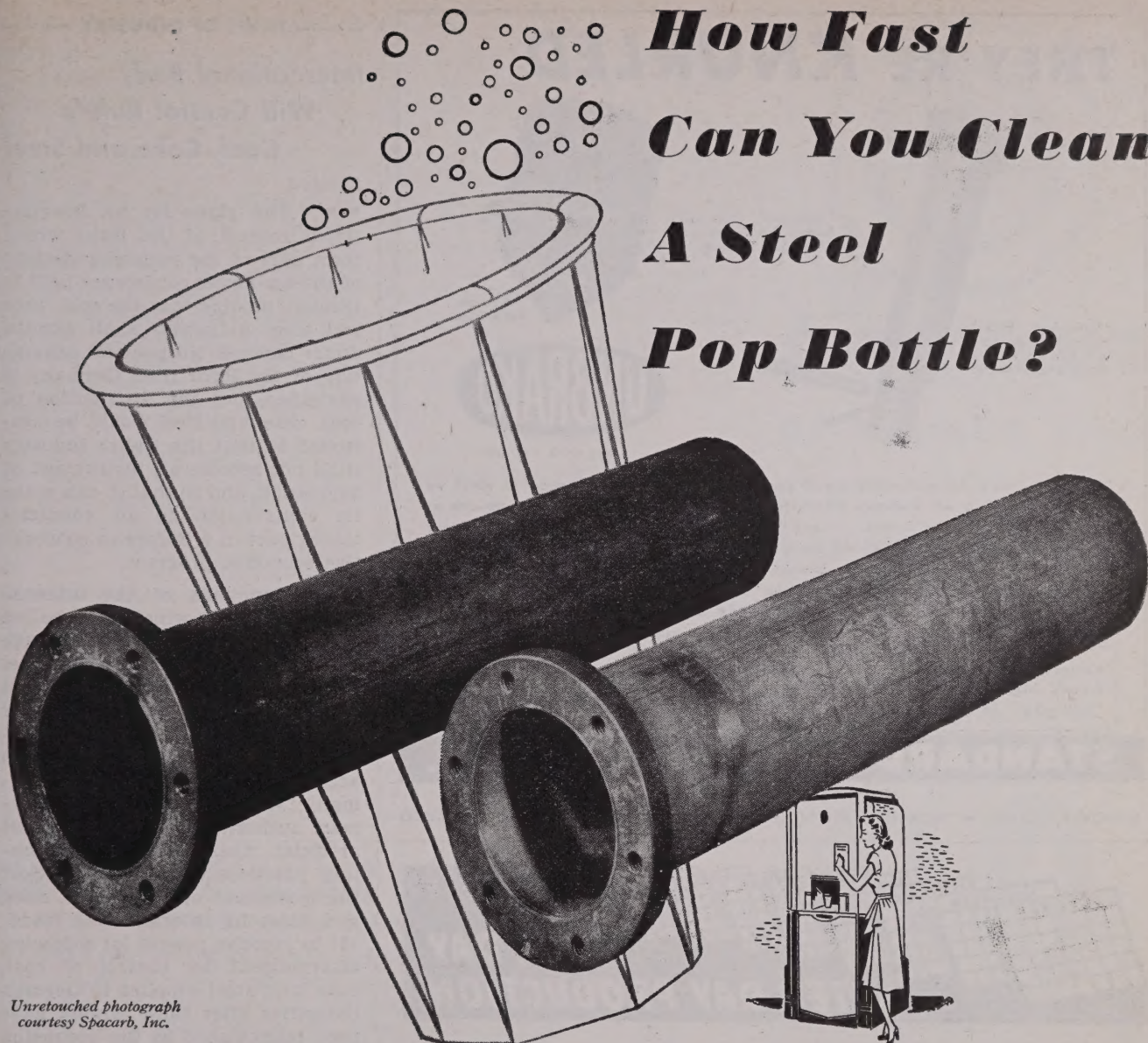
• **James E. Finneran**, president, Columbus Anvil & Forging Co. and Superior Die Tool & Machine Co., Columbus, Ohio, died recently.

• **Whitney G. Case**, 92, former president of the W. A. Case & Son Mfg. Co., Buffalo, died June 12.

**Greater Tonnage
Per Edge of Blade**

**AMERICAN
SHEAR KNIFE CO.**
HOMESTEAD · PENNSYLVANIA

How Fast Can You Clean A Steel Pop Bottle?



Unretouched photograph
courtesy Spacarb, Inc.

Used in coin-operated soda dispensers, these carbonating cylinders are made of stainless steel tubing. The darker of the two has been blackened by welding and silver soldering during fabrication.

Cleaning this cylinder, especially the inside, is a tough, tedious job—unless you use a pickling solution. Dozens of solutions were tried, however, without success—etching reaction made the tube surface unacceptable to Health authorities.

At the suggestion of Frasse, another solution was tried—with the result shown in the picture. Entirely satisfactory in surface finish, the tube is now cleaned at a saving of one hour and fifty minutes per unit.

Frassé makes no pickling solutions (although we'll send details for making this one on request)—but if you use tubing, and like qualified engineering service in its application, you'll find Frasse a good source to standardize on. Alloy, stainless and straight carbon inventories in a wide range of sizes and types for every commercial use. Call us.

Peter A. Frasse and Co., Inc., 17 Grand Street, New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia 29, Pa. (Baldwin 9-9900) 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) • Jersey City • Syracuse • Hartford • Rochester Baltimore

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for steel tubing

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CARBON • ALLOY • STAINLESS

COMMERCIAL AND AIRCRAFT QUALITY

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"Unbrako" Socket Head Stripper Bolt with **KNURLED** Head and Threads.



Pat'd. and Pat's. Pend.

"Unbrako" Cone-point Socket Set Screw with **KNURLED** Threads.



Pat'd. and Pat's. Pend.



Reg. U. S. Pat. Off.

"Unbrako" Socket Screw Products are of quality alloy steel. The "big point," of which we are justly proud, is our exclusive **KNURLING** feature, incorporated either on threads or points of "Unbrako" Set Screws . . . and upon the threads of our latest design Stripper Bolt, as illustrated. This **KNURLING** transforms them all into excellent "Self-Lockers"—especially essential in Stripper Bolts subjected, as they are, to repeated impacts. Of course, the Internal Wrenching feature of "Unbrako" Socket Screw Products promotes compact designs and weight-saving. Sizes available from #4 to 1½" diameter, in a full range of lengths. Ask for your copy of the "Unbrako" Catalog . . . informative and useful.

Knurling of Socket Screws originated with "Unbrako" in 1934.

Write us for the name and address of your nearest "Unbrako" Industrial Distributor.

OVER 45 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PA. BOX 523

BRANCHES BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO



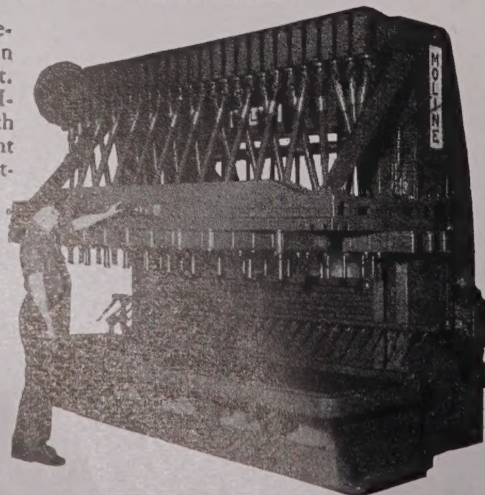
- ★ At greater Man-Hour **SAVINGS**
- ★ At higher rated **EFFICIENCY**
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A Moline Multiple Spindle Specially Designed Machine Tool can do your job better at less cost. Ruggedly built to fit your **INDIVIDUAL** requirements in such operations as Boring — Straight Line Drilling — Universal Adjustable Spindle Drilling — Honing — Tapping — Reaming — Counterboring — Special Milling — these machines are based on years of experience accumulated since 1901.

For your **SPECIAL** problem, go "Hole-Hog" and write us for any information you may need.



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100 20th Street Moline, Illinois

NEWS OF INDUSTRY

International Body Will Control Ruhr's Coal, Coke and Steel

London

• • • The plans for an international control of the Ruhr which form part of the recommendations of the six-Power conference held in London, provide that the coal, coke and steel industries shall remain under control. No political separation of the Ruhr from Germany is envisaged, but the distribution of coal, coke, and steel would be controlled so that the Ruhr's industry shall not become an instrument of aggression, and so that it can make its contribution to all countries taking part in a European cooperative economic program.

The functions of the international authority which is to be set up are enumerated as: (1) To make the division of coal, coke and steel from the Ruhr as between German consumption and export, in order to assure adequate access to supplies of these products taking into account the essential needs of Germany; (2) to assure that the German authorities do not carry out artificial measures or discriminatory practices which would distort the movement of Ruhr coal, coke, and steel in international trade; (3) to exercise powers for enforcing disarmament by control of coal, coke, and steel supplies to German industries after these powers have been relinquished by the occupying powers; (4) to assure protection for coal, coke, and steel enterprises in the Ruhr involving foreign interests.

The International authority's allocations of coal, coke, and steel are to be consistent with the programs of the organization for European Economic Cooperation; it will receive regular reports on production, distribution, and consumption of Ruhr coal, coke, and steel; and have the right to demand additional information and to verify it by inquiries on the spot and by the examination of witnesses.

Aids Scrap Flow to U.S.

Washington

• • • Alfred H. Hirsch has been appointed an industrial specialist in the Office of Industry Cooperation, Dept. of Commerce, to serve

as liaison officer in Germany with the Office of Military Government, United States, to aid in increasing the flow of iron and steel scrap to the American iron and steel industry.

Mr. Hirsch, who is expected to make his headquarters in Frankfurt, Germany, will be available for consultation with Lt. General Lucius Clay and his staff concerning the European steel and scrap economy. He will work in cooperation with OMGUS on the problems pertaining to the collection and preparation of scrap by German dealers.

After being associated with several Pittsburgh scrap metal firms, Mr. Hirsch served as scrap consultant for the Army Service Forces from 1942 to 1945. He then joined the War Assets Administration where he became chief of the iron and steel scrap division in the Cleveland regional office.

India Orders Locomotives

Montreal
 • • • The India Supply Mission has placed orders with Canadian companies for 100 locomotives to

cost approximately \$12,500,000. Of the 100 locomotives for the Indian government railways, 60 will be built by Montreal Locomotive Works at a cost of approximately \$7,500,000 according to Sir Frederick Carson, executive vice-president. The remaining 40 will be built by Canadian Locomotive Co., Kingston, Ont. Delivery will begin in February 1949. Montreal Locomotive Works already has built 90 locomotives for India, and Canadian Locomotive Co. is working on an order for 60 locomotives from the same source.

Contract for 10 Planes

London
 • • • The Swedish Airlines (ABA) have recently signed a contract with the Saab Aircraft Co., of Linköping, for ten "Saab-Scandia" passenger planes intended for their Swedish and European lines. The contracted sum is reported to be about \$4 million and the planes will be delivered successively towards the end of 1949. The Scandia, originally called Saab-90, is a twin-engine, low-wing monoplane to carry 24 to 32 passengers. Two

MATERIALS-HANDLING EQUIPMENT

CUTS OPERATING COSTS . . . SPEEDS OUTPUT

KRANE KAR performance is unmatched. Works anywhere — in the plant or yard — tight quarters, low headroom, long hauls, up and down grades. Makes short work of Loading and Unloading freight cars, trucks, trailers . . . Transporting, Stacking, Storing . . . Plant Maintenance and Repairs. Ideal for handling forgings, bars, blooms, billets, ingots, castings, (or scrap when equipped with magnet). Also heavy objects like transmission cases, machine heads, crankcases, motors, etc. Users report labor-savings up to 75% . . . materials handling costs cut to 8c a ton . . . and elimination of hazard of serious injuries commonly experienced in hand methods.*



Gasoline or Diesel. Equipped with pneumatic or solid rubber tires; 9 to 37 ft. booms or adjustable telescopic booms; electric magnet, clamshell bucket, and other accessories available.

USERS: General Motors; Bethlehem Steel; Todd Shipyards; Boeing; General Electric; duPont; Pullman Standard; etc.

* Case studies on request.

KRANE KAR handles loads at Sides as well as at Front.

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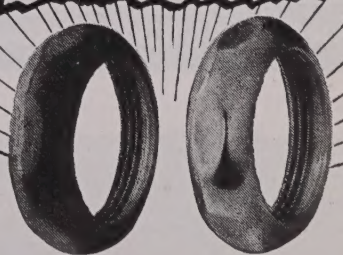
THE ORIGINAL SWING-BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER
 1½, 2½, 5, AND 10 TON CAPACITIES
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DOES CUT DE-BURRING TIME

DIE CASTING COMPANY REPORTS . . . (NAME ON FILE)

"ONE MAN CAN DE-BURR AN AVERAGE OF 12,000 PIECES IN FIVE HOURS."



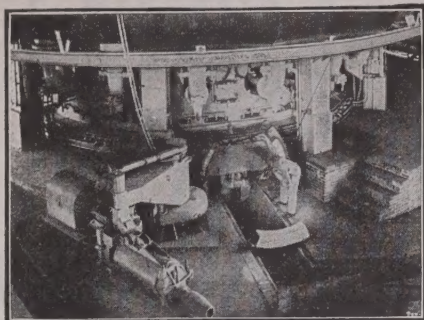
Unretouched illustration shows die cast plumbing fixture at left before Roto-Finish de-burring and finishing; at right after Roto-Finishing.

Roto-Finish eliminates the great bottleneck in modern production. Hand finishing is slow, inaccurate, and requires a large labor force. Roto-Finish processes quickly, uniformly, and without loss of tolerance, enormous quantities of intricate castings and precision parts of steel, brass, aluminum, magnesium, stainless and nickel steels. Send samples for processing. (Include finished part for guide.) No obligation.

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**Low Maintenance
High Performance
Always Reliable**

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improvements, they are better than ever before. One of the following type guns can give you top-flight performance at the lowest possible maintenance cost.

- Electric Gun:** Nozzle pressures exceeding your requirements. Boom travel speed as fast as needed. Alloy gears and rack are standard equipment. Improved boom.
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- Hydraulic Gun:** A new design which is self contained and eliminates all piping from furnace to cast house. A non-inflammable oil is available for hydraulic system. Brosius standard hydraulic designs also available.

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High grade, wide face, coarse pitch gearing — short, heavy shafts to withstand stress and anti-friction bearings throughout, aid strongly in supporting the Euclid guarantee.



THE EUCLID CRANE & HOIST CO.

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NEWS OF INDUSTRY

Pratt & Whitney engines give it a cruising speed of 224 mph. The craft is now on the assembly line in the Saab works, the prototype having been tested for a considerable time.

New X-Ray Diffraction Unit in Commercial Use

Beaver Falls, Pa.

• • • A newly developed fluorescence analysis unit, one of the first five such units constructed, will receive its first commercial use at the local plant of the Babcock & Wilcox Tube Co. It makes possible non-destructive, rapid, quantitative analysis of the elemental constituents of metals, alloys, chemical mixtures and compounds, minerals and ores.

This unit is one of a set of three X-ray diffraction instruments acquired by the company to broaden its facilities for industrial research in both the manufacture and application of tubing. The other two instruments, the Geiger counter spectrometer and X-ray diffraction unit, extend the scope of fine-structure analysis to the ultimate architectural pattern of atoms in space, far beyond the ability of the microscope. The diffraction unit records its analysis on film, while the spectrometer speeds analysis by use of a Geiger counter and recording the results on a chart.

The diffraction unit and the Geiger counter afford a new means for analysis of such problems as determination of alloy phases, and constituents, control of heat treatment and recrystallization of cold-worked metals, grain size, preferred orientation, internal strain, magnetic properties, and structure of welds.

Suspend Import Duties

Washington

• • • President Truman has signed into law a bill extending until June 30, 1949, the present suspension of import duties on ferrous and non-ferrous scrap. Congress, in passing the legislation, said extension was desirable "both from a standpoint of national security and for the satisfying of civilian demand." The House Ways and Means Committee noted that large quantities are "still to be found in a number of foreign countries."